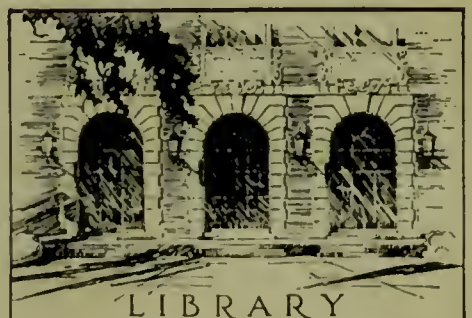
617.606
IL
1883



LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS
617.606
Il
1888

TRANSACTIONS

OF THE

Illinois State Dental Society

AT THE

TWENTY-FOURTH ANNUAL MEETING,

HELD AT

CAIRO, MAY 8TH TO 11TH, 1888.

Private Library
—of—
Dr. HERMANN PRINZ.

COMMITTEE ON PUBLICATION.

GARRETT NEWKIRK. J. W. WASSALL. EDMUND NOYES.

JUN 25 1902

"ARTEM DOCTRINA SANITATEM ARTE."

PUBLISHED BY THE ILLINOIS STATE DENTAL SOCIETY,
CHICAGO.
1888.

W. T. Robinson & Co., Printers,
184 & 186 Monroe Street,
CHICAGO.

617.600
IL
1888

DISCLAIMER.

THE ILLINOIS STATE DENTAL SOCIETY, although formally accepting and publishing the reports of the various committees, and the essays read before it, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution.

LIST OF OFFICERS

FROM DATE OF ORGANIZATION.*

ORGANIZATION AND FIRST MEETING, JULY 24TH, 1865.

Chairman	A. C. VAN SANT†	Princeton.
Secretary	E. HONSINGER	Chicago.

CHICAGO, 1866.

President	A. C. VAN SANT	Princeton.
Vice-President	E. HONSINGER	Chicago.
Secretary	EDGAR PARK	Chicago.
Treasurer	S. BABCOCK	Springfield.
Librarian	J. N. TRUESDELL	Elgin.

CHICAGO, 1867.

President	H. N. LEWIS	Quincy.
Vice-President	O. WILSON	Aurora.
Secretary	G. T. SMITH	Princeton.
Treasurer	M. W. SHERWOOD†	Chicago.
Librarian	L. P. HASKELL	Chicago.

CHICAGO, 1868.

President	GEO. H. CUSHING	Chicago.
Vice-President	A. W. FRENCH	Springfield.
Secretary	M. S. DEAN†	Chicago.
Treasurer	J. N. CROUSE	Mount Carroll.
Librarian	W. W. ALLPORT	Chicago.

QUINCY, 1869.

President	E. H. KILBOURNE	Aurora.
Vice-President	G. P. KINGSLEY	Freeport.
Secretary	H. J. SMITH	Quincy.
Treasurer	A. W. FRENCH	Springfield.
Librarian	M. S. DEAN†	Chicago.

*In the list of officers here presented the year given is the year of the meeting at which they served; their election and installation occurred at the close of the preceding meeting.

†Deceased.

BLOOMINGTON, 1870.

President	M. S. Dean†	Chicago.
Vice-President	G. V. Black	Jacksonville.
Secretary	C. Stoddard Smith	Springfield.
Treasurer	A. W. French	Springfield.
Librarian	C. O. Dean	Mount Carroll.

PEORIA, 1871.

President	G. V. Black	Jacksonville.
Vice-President	S. C. Wilson†	Bloomington.
Secretary	C. Stoddard Smith	Springfield.
Treasurer	G. P. Kingsley	Freeport.
Librarian	E. C. Stone	Galesburg.

CHICAGO, 1872.

President	O. Wilson	Aurora.
Vice-President	J. N. Crouse	Chicago.
Secretary	C. Stoddard Smith	Springfield.
Treasurer	Geo. P. Kingsley	Freeport.
Librarian	J. M. Hurtt	Peoria.

ROCK ISLAND, 1873.

President	J. N. Crouse	Chicago.
Vice-President	S. L. Edwards	Peoria.
Secretary	C. R. E. Koch	Chicago.
Treasurer	S. M. Sturgiss	Quincy.
Librarian	J. M. Hurtt	Peoria.

JACKSONVILLE, 1874.

President	C. Stoddard Smith	Springfield.
Vice-President	E. Honsinger	Chicago.
Secretary	C. R. E. Koch	Chicago.
Treasurer	S. M. Sturgiss	Quincy.
Librarian	R. Matthews	Pontiac.

OTTAWA, 1875.

President	G. S Miles	Jerseyville.
Vice-President	E. D. Swain	Chicago.
Secretary	C. R. E. Koch	Chicago.
Treasurer	C. A. Kitchen	Galva.
Librarian	F. W. Dean	Pekin.

†Deceased.

GALESBURG, 1876.

President	E. D. Swain	Chicago.
Vice-President	K. B. Davis	Petersburg.
Secretary	C. R. E. Koch	Chicago.
Treasurer	C. A. Kitchen	Rockford.
Librarian	O. Wilson	Aurora.

SPRINGFIELD, 1877.

President	K. B. Davis	Springfield.
Vice-President	E. C. Stone	Galesburg.
Secretary	E. D. Swain	Chicago.
Treasurer	C. A. Kitchen	Rockford.
Librarian	E. B. David	Aledo.

ROCKFORD, 1878.

President	C. R. E. Koch	Chicago.
Vice-President	S. M. Sturgiss	Quincy.
Secretary	E. D. Swain	Chicago.
Treasurer	C. A. Kitchen	Rockford.
Librarian	E. B. David	Aledo.

PEORIA, 1879,

President	S. M. Sturgiss	Quincy.
Vice-President	C. A. Kitchen	Rockford.
Secretary	Edmund Noyes	Chicago.
Treasurer	E. C. Stone	Galesburg.
Librarian	W. W. Ormsbee	Geneva.

BLOOMINGTON, 1880.

President	C. A. Kitchen	Rockford.
Vice-President	J. Frank Marriner	Ottawa.
Secretary	Edmund Noyes	Chicago.
Treasurer	E. C. Stone	Galesburg.
Librarian	G. A. Harrington	Delevan.

ROCK ISLAND, 1881.

President	J. Frank Marriner	Ottawa.
Vice-President	J. A. W. Davis	Galesburg.
Secretary	Edmund Noyes	Chicago.
Treasurer	E. C. Stone	Galesburg.
Librarian	G. H. Harrington	Delevan.

QUINCY, 1882.

President	A. W. Harlan	Chicago.
Vice-President	W. T. Magill	Rock Island.
Secretary	Edmund Noyes	Chicago.
Treasurer	E. C. Stone	Galesburg.
Librarian	H. H. Townsend	Pontiac.

DECATUR, 1883.

President	E. C. Stone	Galesburg.
Vice-President	J. J. R. Patrick	Belleville.
Secretary	Edmund Noyes	Chicago.
Treasurer	E. S. Talbot	Chicago.
Librarian	H. H. Townsend	Pontiac.

SPRINGFIELD, 1884.

President	Edmund Noyes	Chicago.
Vice-President	H. H. Townsend	Pontiac.
Secretary	J. W. Wassall	Chicago.
Assistant Secretary	W. H Taggart	Freeport.
Treasurer	J. Campbell	Bloomington.
Librarian	W. B. Woodward	Peoria.

PEORIA, 1885.

President	H. H. Townsend	Pontiac.
Vice-President	M. H. Patton	Springfield.
Secretary	J. W. Wassall	Chicago.
Assistant Secretary	P. J. Kester	Chicago.
Treasurer	C. R. Dwight	Danville.
Librarian	J. W. Cormany	Mount Carroll.

ROCK ISLAND, 1886.

President	T. L. Gilmer	Quincy.
Vice-President	W. B. Woodward	Peoria.
Secretary	J. W. Wassall	Chicago.
Assistant Secretary	P. J. Kester	Chicago.
Treasurer	C. B. Rohland	Alton.
Librarian	W. B. Ames	Chicago.

JACKSONVILLE, 1887.

President	W. T. Magill	Rock Island.
Vice-President	C. B. Rohland	Alton.
Secretary	J. W. Wassall	Chicago.
Assistant Secretary	Louis Ottofy	Chicago.
Treasurer	T. W. Prichett	Whitehall.
Librarian	W. B. Ames	Chicago.

CAIRO. 1888.

President	C. B. ROHLAND	Alton.
Vice-President	CHARLES HENRY	Jacksonville.
Secretary	GARRETT NEWKIRK	Chicago.
Treasurer	T. W. PRICHETT	Whitehall.
Librarian	W. B. AMES	Chicago.

QUINCY, 1889.

President	GEO. H. CUSHING	Chicago.
Vice-President	J. J. JENNELLE	Cairo.
Secretary	GARRETT NEWKIRK	Chicago.
Treasurer	T. W. PRICHETT	Whitehall.
Librarian	W. B. AMES	Chicago.

Standing Committees.

EXECUTIVE COMMITTEE.

P. J. Kester (term expires in 1889).....Chicago.
James Cormany (term expires in 1890) .....Mt. Carroll.
J. W. Wassall (term expires in 1891)..... Chicago.

COMMITTEE ON PUBLICATION.

Garrett Newkirk.....Chicago.
J. W. Wassall..... ...Chicago,
Edmund Noyes.....Chicago.

BOARD OF EXAMINERS.

Geo. D. Sitherwood (term expires in 1889)..... .....Bloomington
J. Frank Marriner (term expires in 1890)..... .....Ottawa.
C. N. Johnson (term expires in 1891).....Chicago.

COMMITTEE ON THE INFRACTIONS OF THE CODE OF ETHICS.

K. B. Davis (term expires in 1889).....Springfield.
T. G. Wonderly (term expires in 1890).....Galena.
J. J. Jennelle (term expires in 1891)..... .....Cairo.

COMMITTEE ON DENTAL SCIENCE AND LITERATURE.

Louis Ottofy (term expires in 1889).....Chicago.
Thomas L. Gilmer (term expires in 1890).....Quincy.
J. D. Moody (term expires 1891)..... ....Mendota.

COMMITTEE ON DENTAL ART AND INVENTIONS.

J. Frank Marriner (term expires in 1889)..... .....Ottawa.
Eugene S. Talbot (term expires in 1890).....Chicago.
W. B. Ames (term expires in 1891)..... Chicago.

SUPERVISOR OF CLINICS.

Frank H. Gardiner..... ..... Chicago.

INDEX TO TRANSACTIONS.

PAGE.

Active Members, list of....17, 20

Annual Meeting, place of.... 44

Appropriations 40

Address of Welcome, by Mr. Green, and Response by Dr. Koch.... ....22, 26

Appointments—

Board of Examiners.... 45
Supervisor of Clinics.... 45
Member of Executive Committee.... 45
Committee on Publication.... 45
Committee on Infraction of Code of Ethics.... .. 45

Amendments—

Proposed by Dr. Stevens, lost.... 30
Proposed by Dr. C. Stoddard Smith.... 44
Ames, W. B., paper on Amalgams.... 123

Addresses, Essays and Discussions—

Annual Address by President, Dr. Rohland.... 47
Report of Committee on Dental Science and Literature.... 58

Discussed by—

Dr. Brophy.... 68
Dr. Harlan.... 70
Dr. Gardiner.... 69
Dr. Noyes....70, 72
Dr. Cushing.... ....71, 75
Dr. A. W. Freeman.... ....72, 74
Dr. Sitherwood.... 73
Dr. Black 73
Dr. Wassall.... 73
Dr. Gilmer 74
Dr. Ames.... 74
Dr. Patrick.... 74
Dr. Ottofy.. 76

Report of Committee on Dental Art and Inventions....78, 82

Paper by Dr. Patrick on Dental Morphology and the Etiology of Irregularities.....83, 90

Discussed by—

Dr. Black.....91, 99
Dr. Carroll..... 97
Dr. Taylor..... 98
Dr. Patrick..... 99, 101

Paper on Operative Dentistry by Dr. Ottofy.....102, 110

Discussed by—

Dr. Wassall..... 110
Dr. Crouse.....116, 122
Dr. Taylor..... 115

Paper by Dr. Ames, on Amalgams.....123, 130

Report of Supervisors of Clinics.....131, 133

Discussion—

Dr. Taylor.....134, 135
Dr. Crouse.....136, 137, 143
Dr. Cushing..... 136
Dr. Richards..... 136
Dr. Reid..... 136
Dr. Pruyn.....137, 144, 145
Dr. Harlan..... 137
Dr. Koch..... 138
Dr. Sitherwood.....138, 140
Dr. Swain..... 139
Dr. Ottofy.....139, 144
Dr. Greene..... 140
Dr. Morrison..... 140
Dr. Johnson.....141, 142
Dr. Black..... 143
Dr. Gilmer..... 144
Dr. A. W. Freeman..... 146
Dr. Moody..... 147
Dr. Newkirk.....148, 149
Dr. Laurance..... 150

Some main points touching Conservative Treatment of Teeth whose pulps are nearly or quite exposed.

Paper by Dr. Moody.....152, 257

What shall we do with Inflamed Pulps?

Paper by Dr. Johnston.....158, 164

Discussed by—

Dr. Harlan.....165, 174, 177, 178

Dr. Crouse.....167, 168, 179
Dr. Stevens.....169, 179
Dr. Wassall.....169, 170
Dr. Cushing.....171, 172, 178
Dr. Gilmer..... 171
Dr. Townsend.....172, 177
Dr. Sitherwood..... 175
Dr. Noyes.....175, 176
Dr. Keith..... 175
Dr. Rowland, of Tennessee..... 176
Dr. A. W. Freeman..... 177
Dr. Taggart..... 177
Dr. Cummings..... 178

Discussion on Prosthetic Dentistry.

Dr. Swain.....180, 183
Dr. Taylor..... 183
Dr. Ames..... 184
Dr. A. W. Freeman..... 185

Dr. Marriner's Paper, Making and Tempering Dental Instruments.....186, 190

Discussed by—

Dr. Cushing.....191, 194, 201
Dr. A. W. Freeman.....194, 200
Dr. Morrison.....196, 198
Dr. Taggart.....198, 199
Dr. Cormany..... 198
Dr. Nelson..... 199
Dr. Wassall..... 199
Dr. Ames.....195, 201
Dr. Swasey..... 200

Dr. Patrick's Lecture on the Rationale of Constructing and attaching artificial crowns to the natural roots of teeth.....202, 208
Appropriations to State Board..... 40

Committees, Report of—

On Clinics..... 131
" Dental Art and Inventions..... 78
" Science and Literature..... 58
" Publication..... 29
" Place of Meeting..... 40
As to Dr. Patrick's Dissections..... 43
On Conference with State Board.....35, 40
Committees Appointed to revise pamphlet entitled *The Teeth*..... 37
On Crown and Bridge Suits..... 36
On Legislation..... 43, 44
Corresponding Members, election of.....31, 36

Clinics.

Dr. Cormany, filling 131
Dr. Dunn, treatment of all abscesses 131, 133
Dr. K. B. Davis, filling 131
Dr. Kitchen, filling 131
Dr. Freeman, filling 131
Dr. Pruyn, use of Cocoaine 131, 132
Dr. Brophy, filling, with matrix 132
Dr. Swain, filling 132
Dr. J. G. Reed, filling 132
Dr. Patrick, gold crowns 132
Dr. Harlan, treatment of Pyarrhea Alveolaris 132, 133
Dr. W. N. Morrison, replantation 133
Dr. Gilmer, gold and platinum crown 133
Dr. Parsons, warm air injector 133

Obituary.

Dr. G. O. Howard 33
Dr. J. S. Reynolds 34

Report of Officers 27, 29

Resolutions.

Dr. Harlan as to Dental Colleges 30
Dr. Harlan as to Local Societies 39
Dr. Noyes, vote of thanks 43
Dr. C. Stoddard Smith, as to State Board and Legislation 43

Roll of Membership, 1888.

The following is a list of the active members:

Those whose names are marked with an asterisk (*) were not present at the meeting.

*Allen, E. H. ..... Freeport.
*Alport, W. W. ..... Jackson and Michigan Avenue, Chicago.
Ames, W. B ..... State Street, Chicago.
*Antes, R. H. ..... Geneseo.
*Austin, J. F. ..... 125 State Street, Chicago.
*Bailey, R W. ..... Macomb.
*Baldwin, A. E. ..... 828 West Adams, Chicago.
*Beckwith, T. W. ..... Sterling.
Black G. V. ..... Jacksonville.
*Blair, E. K. ..... Waverly.
*Blythe, J. M ..... Decatur.
Brophy, T. W. ..... 96 State Street, Chicago.
*Brown, A. E. ..... 1536 Wabash Avenue, Chicago.
*Burress, A. E. ..... Walnut.
Call, E. B. ..... Peoria.
Campbell, J. ..... Bloomington.
Campbell, S. A. ..... Mattoon.
Chambers, P. H. ..... Fairfield.
*Chamberlain, C. W. ..... Lanark.
*Chappell, O. A. ..... Elgin.
Cheadle, E. M ..... Murphysboro.
*Christianer, F. ..... Abington.
*Christman, G. A. ..... 93 Fifth Avenue, Chicago.
Clark, A. B. ..... 89 Madison Street, Chicago.
*Collins, J. W. ..... Lincoln.
Cormany, J. W. ..... Mt. Carroll.
Crouse, J. N. ..... 2231 Prairie Avenue, Chicago.
Cummins, J. F. ..... Golconda.
Cushing, G. H. ..... 96 State Street, Chicago.
David, E. B. ..... Aledo.
*Davis, J. A. W. ..... Galesburg.
Davis, K. B. ..... Springfield.
Davis, L. L. ..... 522 West VanBuren Street, Chicago.
*Dayan, L. F. ..... Hyde Park.
*Dean, W. W. ..... Lacon.
*Dennis, G. W. ..... Lasalle.
Dickson, J. G ..... Carmi.
*Dillon, G. B. ..... Sterling.

DORN, C. P. ..... Naperville.
*DOOLITTLE, M. J. ..... Lanark.
DUNCAN, E. ..... Jacksonville.
*DUNCAN, S. F ..... Wilmington.
DUNN, J. AUSTIN ..... 70 Dearborn Street, Chicago.
*DWIGHT, C. R. ..... Danville.
*EATON, A. V. ..... Effingham.
*ELMER, A. B ..... Rochelle.
ENTSMINGER, G. W. ..... Carbondale.
*FITCH, H. H. ..... Pekin.
FISHER, J. W. ..... Bloomington.
FISHBURN, J. M. ..... El Paso.
FREEMAN, A. W. ..... 112 Clark Street, Chicago.
FREEMAN, D. B. ..... Drexel boul. and 40th St., Chicago.
*FREEMAN, I. A. ..... 65 Madison Street, Chicago.
GARDINER, F. H. ..... 126 State Street, Chicago.
*GILL, H. C. ..... Rockford.
GILMER, THOS. L. ..... Quincy.
*GOEBEL, ROBT. ..... Lincoln.
GREEN, E. J. ..... Peoria.
*GRIFFIN, E. L. ..... 125 State Street, Chicago.
*HANAFORD, M. L. ..... Rockford.
*HAND, M. F. ..... Joliet.
*HARLAN, A. W. ..... 70 Dearborn Street, Chicago.
*HARTINGTON, G. H ..... Delevan.
HARRIS, A. J. ..... 279 Warren Avenue, Chicago.
*HASKELL, L. P. ..... 125 State Street, Chicago.
HENRY, CHAS. ..... Jacksonville.
*HERRON, J. C ..... Olney.
HINKINS, J. E ..... Hyde Park.
*HONSINGER, E ..... 318 Park Avenue, Chicago.
*HURTT, J. M. ..... Mt. Vernon.
JENNELLE, J. J. ..... Cairo.
JOHNSON, C. N ..... 112 Clark Street, Chicago.
JOHNSTON, W. A. ..... Peoria.
*JUDD, HOMER. ..... Alton.
KEEFE, J. E. ..... 912 Opera House bldg , Chicago.
*KERN, E. L. ..... Galena.
KESTER, P. J. ..... 567 West Madison Street, Chicago.
KITCHEN, C. A ..... Rockford.
KOCH, C R. E. ..... 3011 Indiana Avenue, Chicago.
LAURANCE, R N. ..... Lincoln.
LEWIS, C. W. ..... 445 N. Clark Street, Chicago.
*LIONBERGER, J. M. ..... Dallas City.
LUMPKIN, J. A ..... Mattoon.
MACE, R. H. ..... Belleville.
*MAGILL, W. T. ..... Rock Island
MARTIN, W. C ..... Peoria.

MARRINER, J. F. ..... Ottawa.
*MARSHALL, J. S. ..... Argyle Bldg. Jackson and Michigan Av., Chicago.
*MATTESON, A. E. ..... 3700 Cottage Grove Avenue, Chicago.
MATTESON, C. F. ..... 3501 Cottage Grove Avenue, Chicago.
*MCINTOSH, F. H. ..... Bloomington
*MILES, G. S. ..... Jerseyville.
MOODY, J. D. ..... Mendota.
*MOODY, K. C. ..... Mendota.
*MURPHY, J. D. ..... Bushnell.
NELSON, NELS. ..... 230 Milwaukee Avenue, Chicago.
NEWKIRK, GARRETT. ..... Wabash Ave. and 16th St., Chicago.
NOYES, EDMUND. ..... 65 Randolph Street, Chicago.
*ORMSBEE, W. W. ..... Galena.
OTTOFY, LOUIS. ..... 1228 Milwaukee Avenue, Chicago.
PATRICK, J. J. R. ..... Belleville.
PATTON, M. H. ..... Springfield.
*PECK, J. W. ..... Canton.
PENNY, A. D. ..... Chester.
PHILLIPS, L. T. ..... Nashville.
PRICHETT, T. W. ..... Whitehall.
PRIESTMAN, W. H. ..... Pontiac.
PRUYN, C. P. ..... 70 Dearborn Street, Chicago.
REID, J. G. ..... 69 Dearborn Street, "
RICHARDS, W. P. ..... 6218 Wentworth Avenue, Englewood.
*ROBERTS, N. J. ..... Waukegan.
ROBBINS, E. M. ..... Carthage.
ROHLAND, C. B. ..... Alton.
ROYCE, E A. ..... 643 W. Monroe Street, Chicago.
SAWYER, C. B. ..... Jacksonville.
SALOMON, G. S. ..... 15 Central Music Hall, Chicago.
*SALTER, G. B. ..... Joliet.
*SAWHILL, F. H. ..... Clinton.
SCHADLE, A. C. ..... Warren.
SHAFER, C. H. ..... Anna.
SITHERWOOD, G. D. ..... Bloomington.
*SMITH, H. J. ..... Quincy.
SMITH, W. B. ..... 126 State Street, Chicago.
SMITH, C. STODDARD. ..... 103 State Street, Chicago.
*SNYDER, S. C. ..... Henry.
*STEPHENS, J. W. ..... Dixon.
STEVENS, W. A. ..... 2631 Wabash Avenue, Chicago.
*STONE, E. C. ..... Galesburg.
*STURGISS, S. M. ..... Quincy.
*SUNDERLAND, D. E. ..... Freeport.
SWAIN, EDGAR D. ..... 65 Randolph Street. Chicago.
SWASEY, J. A. ..... 3017 Michigan Avenue, Chicago.
TAGGART, W. H. ..... Freeport.
*TALBOT, E. S. ..... 125 State Street, Chicago.

TAYLOR, C. R.....Streator.
*THAYER, C. H .....Chicago.
*THOMPSON, J. F..... .....17 Central Music Hall, Chicago.
*TIBBETS, C. J.....Quincy.
TOWNSEND, H. H.....Pontiac.
WALTZ, A. S.....Decatur.
WASSALL, J. W.....208 Dearborn Avenue, Chicago.
WIKOFF, B. D.....70 Dearborn Street, Chicago.
*WIDENHAM, J. C..... .....Jacksonville.
WONDERLY, T. G..... .....Galena.
*WOODWARD, W. B..... .....Peoria.

Total number of active members present during the meeting, 78.

During the four days of the meeting the following named were elected and qualified Active Members of the Society.

J. G. DICKSON. .....Carmi.
B. D WICKOFF.. ....Chicago.
J. E. KEEFE..... .....Chicago.
C. W. LEWIS .....Chicago.
E. M. CHEADLE.....Murphysboro.
G. W. ENTSMINGER.....Carbondale.
P. H. CHAMBERS .....Fairfield.
J. F. CUMMINS..... .....Galconda.
J. E. HINKINS..... .....Hyde Park.
C. H. SHAFER.....Anna.
A. D. PENNY.....Chester.

The following named were elected Corresponding Members:

GEO. CUNNINGHAM, B.A., D.M.D. L.D.S.....Cambridge, England.
JOHN E. GREVERS, D.D.S.....Amsterdam, Holland.
J. G. VAN MARTER, A. M., D.D.S..... Rome, Italy.
M. M. LEVETT, D.D S..... .....Paris, France.
E. MAGITOT, M D..... Paris, France.
A. H. SYLVESTER, D.D.S..... .....Berlin, Germany.
CHAS. S. TOMES, F.R.S..... .....London, England.
J. WALKER, M.D., L.D.S. .....London, England.

The following is a list to date of the Honorary and Corresponding Members:

W. C. BARRETT, Buffalo, N. Y.
C. B. BALDWIN, Los Angeles, Cal.
G. A. BOWMAN, St. Louis, Mo.
C. C. CRITTENDON, Madison, Wis.
C. GEO. CROWLEY, New York, N. Y.
R. L. COCHRAN, Burlington, Ia.
W. H. EAMES, St. Louis, Mo.
GALE FRENCH, Pittsburg, Pa.
GEO. A. BRONSON, St. Louis, Mo.
C. R. BUTLER, Cleveland, Ohio.
F. A. BREWER, San Francisco, Cal.
GEO. CUNNINGHAM, Cambridge, Eng.
H. S. CHASE, St. Louis, Mo.
F. W. DEAN, Des Moines, Ia.
A. H FULLER, St. Louis, Mo.
JOHN E. GREVERS, Amsterdam, Hol.

J. HARDTNER, Springfield, Ill.
L. C. INGERSOLL, Keokuk, Ia.
W. O. KULP, Davenport, Ia.
E. MAGITOT, Paris, France.
W. N. MORRISON, St. Louis, Mo.
JOHN B. MORRISON, Indianapolis, Ind.
EDGAR PARK, St. Louis, Mo.
R. S. RATHBURN, Clinton, Ia.
A. H. SYLVESTER, Berlin, Germany.
C. W. STUTENROTH, Watertown, D. T.
J. G. TEMPLETON, Pittsburg, Pa.
J. G. VAN MARTER, Rome, Italy.
J. WALKER, London, England.
E. E. HUGHES, Des Moines, Ia.
G. W. KELLY, Oxford, O.
M. M. LEVETT, Paris, France.
H. J. MCKELLOPS, St. Louis, Mo.
W. D. MILLER, Berlin, Germany.
R. J. PORRE, Cincinnati, O.
THOS. W. REED, Macon, Mo.
J. W. REED, Mexico, Mo.
C. W. SPAULDING, St. Louis, Mo.
J. TAFT, Cincinnati, O.
CHAS S. TOMES, London, England.
GEORGE WATT, Zenia, O.
J. P. WILSON, Davenport, Ia.

Of the above named there were present at the meeting Drs. Eames, W. N. Morrison, A. H. Fuller, and G. A. Bowman.

MINUTES OF TRANSACTIONS

OF THE

Illinois State Dental Society.

MEETING OF 1888.

TUESDAY, MAY 8.

FIRST DAY—MORNING SESSION.

THE TWENTY-FOURTH ANNUAL MEETING OF THE ILLINOIS STATE DENTAL SOCIETY was called to order at 10:30 a. m. Tuesday, May 8th, 1888, in the Opera House, at Cairo, Ill., by the President, Dr. C. B. Rohland, of Alton.

Prayer was offered by the Rev. F. P. Davenport, of Cairo.

The call of the roll of active members showed that fifty-four were present at the opening of the meeting.

MR. REID GREEN, in behalf of the mayor and citizens of Cairo, made an address of welcome as follows:

MR. GREEN.—Members of the Dental Society, Ladies and Gentlemen: I have been requested on behalf of the Mayor of the city and the citizens, to extend to you, the members of the Illinois State Dental Society, a most cordial welcome to our city. To the citizens I extend my most ardent congratulations that we have with us to-day such a distinguished body of gentlemen as visitors.

Gentlemen, we are very proud of the advancement of our little city. You no doubt know of Cairo as Eden—Dickens' Eden.

Many of you no doubt know of Cairo back in the sixties as the place from which the old commander took his start. Many of you no doubt, and as I understand, were here then. You know what our town was then, and you know it as Dickens pictured it.

Gentlemen, since that time we have developed our resources, we have overcome those obstacles, which were no doubt known to you then. We have used our every endeavor to bring our city up, and at present we know nothing in this town save advancement. (Applause.) And, gentlemen, I must say that I feel proud, and I know the citizens here assembled feel proud that we have such an intelligent band of inspectors present to-day, to view our city and pass upon it.

But I am very well aware that your time is precious. I would, if I had the time, speak at length of your noble calling, of the work you do for humanity, and of those good qualities which are possessed by so many who are in your ranks. But I am admonished that your time is valuable, and that it can be more profitably occupied in other matters than by listening to a long address from me. Therefore, I simply from the bottom of my heart give voice to the sentiments of every citizen of Cairo, and extend to you a most cordial and hearty welcome to our city. (Applause.)

This was responded to for the Society by Dr. C. R. E. Koch, of Chicago, as follows:

Mr. Green:—By the partiality of our esteemed president I have been detailed to respond to the cordial greeting the people of the historic city of Cairo have so eloquently extended to this society through you. Permit me to observe, sir, even at the sacrifice of reputation for modesty, that no member of this society is better able to appreciate your kindly welcome than myself.

I was once a dweller among you, nearly twenty-six years ago I paid a special assessment here. Together with some 950 other fellows, who brought their baggage on their backs, I arrived here in August, 1862. Mine host of the St. Charles hotel, unlike Mr. Parker, had no rooms reserved for us, but we were invited to

hospitable beds on the bottom land enclosed between the Ohio and Mississippi levees, just the other side of the Halliday house, and we were told to make ourselves comfortable on the downy surface of old mother earth, which two days previous rain had rendered particularly soft and pleasant for repose.

We were a band of Young Men's Christian Association men and of Scions of the Board of Trade of Chicago,—and at once sent up a prayer for straw. In the language of the present day it would be said "we kicked for straw." Our prayer or "kick" was effectual. The straw was providentially forthcoming and we at once were no longer to fame unknown. That great army of the Tennessee, of which we soon become an integral part, knew us ever, up to the time of our peaceful dissolution, as the *Straw Regiment*.

One of our guards on a bright moonlight night, saw a Cairo bovine approaching him. Having been instructed to challenge anything that might come near his post and to shoot, if the challenge was unheeded, he pulled the trigger of his Fremont Belgian rifle. The dead body of the quadruped was the result of its disobeying the command to "Halt!" The next morning the members of the guard, of which your humble servant was a member, were called upon to stand a per capita assessment to reimburse the owner of the animal. This was not done merely because the man made a terrible fuss about the matter, nor from fear of punishment, but particularly because the principles of the Board of trade and Young Men's Christian Association, of Chicago, were so strongly rooted in our consciences, that we felt justice had to be done, even though it cost us half a dollar apiece.

Sir, it will perhaps be a surprise to you to hear me assert my claim of being the oldest Cairo dentist now in this city. My office in 1862 was in a row of sheds, situated, perhaps, twenty rods to the south of the Halliday. Uncle Sam was the landlord and I paid no rent. A camp stool was the operating chair, a cracker box (one of the B. C. kind) served as table and six or seven pounds of steel instruments, a book of tin foil and a bottle of amalgam, comprised my outfit. The business was not very lucrative or extensive, and really the success of those operations is still problematical.

One of my patrons of those days has become one of the most noted evangelists of this country. It may seem like conceit, but somehow it has always impressed me that there was a connection between my Cairo dentistry and his evangelistic career. Permit me to assure you, sir, (turning to Mr. Green,) that these men you see here are more skilled than I was, and should you fall a victim to their science you would be in no danger of becoming a preacher, although it is not altogether improbable that it might make you a senator.

There are a number of our members here, sir, who remember your city as it was during those years that tried men's souls, and who believed that times of peace would sound the death knell to the progress and prosperity of your city. In this we are glad to see we were mistaken. Providence has given to your city the key of our inter-state water communication from the Alleghanies to the Rockies, and to the Gulf of Mexico; and when congress shall have wisdom sufficient to create a channel that shall connect your river commerce with the Gulf of St. Lawrence, there is no doubt but Cairo will still continue to grow and prosper more and more.

Somewhere I have read in sacred or profane history that "T'was here the Queen of Sheba came to Solomon of old," with a wondrous load of spices, pomegranates and fine gold, and when this lovely point she saw her heart was filled with joy; she straightway said she'd like to be Queen of Cairo, Illinois.

We are glad to be in Cairo. Many of our members feared to come so far, but coming has taught us all a lesson of the extended wealth and importance of our state. With Cairo in the extreme south and Chicago in the north, to say nothing of St. Louis in the west, it does not seem that Illinois can take anything but a leading position in the commerce of the nation.

This society is now twenty-four years old. During this time it has met annually at different points in the State. Its sole aim and object has always been to increase the standard of attainments of its members in order that they might be able to give more comfort to

suffering humanity. Unlike trade unions and many other societies the question of "The Mighty Dollar, and How to Get it in Large Quantities," has never entered in its deliberations. No corner on dentistry has ever been organized by it, nor has it ever undertaken to say how many hours a day its members should labor, or what fees they should collect.

In the fourth chapter of Genesis it is recorded, "And Abel was a keeper of sheep and Cain was a tiller of the ground," showing stock raising and farming to be the most ancient of callings. The good book speaks of many special fields of labor and usefulness, but dentists are compelled to confess that their's is a comparatively modern calling. In its brief life, however, its votaries have frequently silenced and overawed emperors and prelates. The pulpit and the forum are alike dumb when reposing in our chairs, and the fascinating and irresistible accents of woman's melodious tongue are frequently hushed into painful silence by us.

With all this latent potency we are notwithstanding an exceedingly mild-mannered and peaceful set of citizens. I pray you, sir, assure the good people of Cairo that when we go from here our labors for this year ended, we shall take with us the recollection of time profitably and well spent, and that their kindly greeting and hospitable attentions contributed in no small degree to the success, comfort and enjoyment of our meeting. (Applause.)

The Executive Committee reported the printed programme as the order of business for the meeting.

Adopted.

Dr. Brophy moved that the names of Drs. J. D. and Kate C. Moody be transferred from the list of corresponding to that of active membership.

Carried.

The Reports of the Secretary, Treasurer and Publication Committee were read in the order named and referred to the Executive Committee for auditing.

SECRETARY'S REPORT.

MR PRESIDENT AND GENTLEMEN:—Your Secretary offers the following Annual Report:

The total active membership at last Annual Report, including names of Drs. J. D. and Kate C. Moody incorrectly reported as removed from the state 131

The number of new active members admitted, last annual meeting..... 12

Making total at close..... 143

So far as the Secretary knows there has been no loss by removal from the state. Dr. Hurtt has located for a time at Pomona, California, but has not yet removed his family thither. He has sent his dues for the ensuing year.

There are lost by non-payment of dues, 1886–1887:

B. T. Harrison,

J. J. Cresswell..... 2

By resignation:

A. T. Olmstead,

T. F. McCoy..... 2

Leaving total active membership..... 139

The number of honorary and corresponding members remains as at time of last report..... 41

Dr. E. W. Anderson, of Indianapolis, was elected a corresponding member, at last meeting. Dr. J. S. Reynolds, of Munroe, Wisconsin, a corresponding member has since died.

The following is a statement of moneys received by the former and present secretary since the last report:

Received by dues and initiation fees at last meeting.....	$370.00
Dues since paid	160.00
Amount paid for advertisements in transactions.....	91.00
	$621.00

For which the treasurer's receipt is herewith submitted.

The amount due the society from members in arrears on account of dues, not including those dropped for non-payment is..... $44.00

Bills have been sent to all those several times during the year, and personal letters recently to those whose names are dropped from the roll.

Respectfully submitted,

GARRETT NEWKIRK, *Secretary.*

TREASURER'S REPORT.

Cairo, Illinois May 8th, 1888.

MR. PRESIDENT AND MEMBERS OF THE ILLINOIS STATE DENTAL SOCIETY:—Your Treasurer, offers the following Annual Report:

RECEIPTS.

To balance on hand at the close of last year's session	$ 89.20
To amount received from Secretary to date	621.00
Total amount received	$710.20

DISBURSEMENTS.

By amount paid voucher No. 76	$ 67.20
By amount paid exchange,	.20
By amount paid voucher No. 77	10.00
" " " " " 78	25.00
" " " " " 79	25.00
" " " " " 80	100.00
" " " " " 81	100.00
" " " " " 82	10.98
" " " " " 83	259.00
" " " " " 84	61.71
Total	$658.09
Balance in my hands	51.11

T. W. PRICHETT, *Treasurer.*

REPORT OF THE COMMITTEE ON PUBLICATION.

MR. PRESIDENT AND GENTLEMEN:—Your Committee offers the following report:

It seemed best to us last year to attempt the independent publication of the Transactions. Proposals were, therefore, submitted to several houses in Chicago, and the work awarded to the lowest bidder. Our success in securing advertisements was not equal to our anticipations and the net cost of publications exceeded that of some previous years.

Five hundred copies were printed, one hundred and fifty bound in cloth, three hundred and fifty in paper covers. Of this number, forty-eight copies are on hand. About three hundred copies have been sent as heretofore to Dental periodicals, prominent dentists, and scientists in this and other countries. Many pleasing letters of acknowledgment have been received showing that favors have been duly appreciated.

The expenses for publication have been as follows:

To W. T. Robinson & Co., printers and binders	$234.00
To Cobb Library Co., engravers	25.00
	$259.00
Received from advertisements	91.00
Leaving net cost of publication	168.00

The expenses of postage and delivery are included in account of secretary.

Respectfully submitted,

GARRETT NEWKIRK,
J. W. WASSALL,
EDMUND NOYES.

DR. AMES, Librarian, made his report and presented a bill for expenses.

LIBRARIAN'S REPORT.

As Librarian of the Illinois State Dental Society, I wish to submit the following report:

The number of volumes in the society's library has not been increased during the past year. Four photographs have been added to the collection. There has been procured for the accommodation of this collection a substantial album, the bill for the purchase of which I herewith submit.

I would respectfully recommend that the action taken by the society in 1886, authorizing the librarian to purchase models for the purpose of illustration be rescinded. I believe the same to be impracticable, having examined all such articles obtainable.

Respectfully submitted,

W. B. AMES, *Librarian.*

The report was adopted and the bill ordered paid.

The President, Dr. C. B. Rohland, read the annual address, the vice-president, Dr. Henry, in the chair.

Adjourned to meet at 2:30 p. m.

FIRST DAY—AFTERNOON SESSION.

The Society was called to order at 2:30 by the President.

The minutes of the morning session were read and approved.

The Executive Committee reported that they had examined the accounts submitted to them by the Secretary, Treasurer and Publication Committee, and found them to be correct.

On motion the several reports were adopted.

Dr. Wassall moved that a Committee be appointed to draft resolutions of respect in memory of Dr. Geo. O. Howard, a former member of this Society, recently deceased.

The motion prevailed, and the President appointed as committee Drs. J. W. Wassall, T. W. Brophy and C. P. Pruyn.

Dr. Harlan called for the reading of the amendment proposed last year by Dr. Stevens, viz., to strike out from Section I, Article V of the By-Laws, all before the words 'shall require each student.'

A motion was made to adopt the amendment.

The question was discussed by Drs. Noyes, Moody, Crouse, Taylor, Koch, Nelson, Black, Gardiner, Prichett and Wassall.

The motion to adopt was lost.

Dr. Wassall offered the following as a standing resolution, viz.: "That it is the sense of this Society that Section I, Article V of the By-Laws be construed to include the college terms."

The resolution was adopted.

Dr. Harlan offered the following preamble and resolution:

WHEREAS, The majority of the dental colleges do not require of their students a longer period of pupilage than two years prior to the candidate coming up for graduation; and

WHEREAS, The Illinois State Dental Society believes that the time spent in college or in the study of dentistry is too short for the proper preparation for entrance upon the practice of dentistry; therefore be it

Resolved, That the National Association of Dental Faculties be requested at their forthcoming meeting in Louisville to adopt as a requirement for graduation that the student shall have studied three full years, including attendance upon two full courses of college instruction in separate years.

Unanimously adopted.

Dr. Reid, moved that the privileges of the floor be extended to visiting dentists and physicians.

Carried.

The Board of Examiners recommended the following named for election to corresponding membership:

Geo. Cunningham, D. M. D., L. D. S., Cambridge, England.
John E. Grevers, D. D. S., Amsterdam, Holland.
J. G. Van Marter, D. D. S., Rome, Italy.
M. M. Levett, D. D. S., Paris, France.
A. H. Sylvester, D. D. S., Berlin, Germany.
E. Magitot, M. D., Paris, France.
Chas. S. Tomes, F. R. S., London, England.
J. Walker, M. D , L. D. S., London, England.

Dr. Cushing moved that the report be recommitted for amendment, in that it fails to give the information required by the constitution. (See Sec. 3 Constitution, and Art. III, and Sec. 4, Art. III, By-Laws.)

The motion was carried.

In the absence of the chairman of the Committee on Dental Science and Literature, Dr. Hanaford, the report was read by Dr. Ottofy, a member of the Committee.

The report was discussed by Drs. Brophy, Harlan, Noyes, Cushing, Kitchen, A. W. Freeman, Sitherwood, Black, Wassall, Gilmer, Ames, Patrick, and Dr. Ottofy, closing.

On motion the subject was passed.

Dr. Taggart, chairman of the Executive Committee announced that Dr. Carroll would be unable to give the lecture set for five o'clock.

The report of the Committee on Dental Art and Invention was read by Dr. Marriner, a member of the Committee.

The subject was passed without discussion.

Dr. Richards, Supervisor of Clinics, made some announcements relating to the work of the morrow.

The Secretary read a communication from the ladies of the Episcopal Church of Cairo, inviting the members of the Society to supper at the Rink, Wednesday and Thursday evenings.

Adjourned to meet Wednesday, at 2:30 P. M.

WEDNESDAY, MAY 9.

SECOND DAY—MORNING SESSION.

Morning devoted to Clinics. See Report of Supervisor of Clinics.

AFTERNOON SESSION.

The meeting was called to order by the President at 2:30 P.M. The minutes of the preceding session were read and approved.

Dr. Taggart moved that Dr. Carroll's lecture be made the special order for eight o'clock this evening.

Dr. Gilmer moved to amend by limiting time to thirty minutes.

Lost.

The original motion prevailed.

Dr. Wassall, chairman of the committee on resolutions commemorative of Dr. Geo. O. Howard, offered the following:

Your Committee to whom was intrusted the preparation of Resolutions Memorial to the late Dr. Geo. O. Howard, of Waukegan, Ills., respectfully submit the following:

Resolved, The Illinois State Dental Society having learned with profound sorrow of the death of Dr. Geo. O. Howard, of Waukegan, a former member of this Society, desires to spread upon its records the following memorial in testimony of the worth and professional attainments of one whom we mourn, and of the loss the profession has sustained by his death. He at one time held a promising position in this Society, and was very energetic in all that pertained to the advancement of the dental profession. At the time of his greatest activity, he was of special service in the development of the methods and appliances used in operative dentistry.

Resolved, The older members of this Society must always retain the pleasantest recollections of their intercourse with him, and of his interest in and efforts on behalf of this body during its earlier years.

Resolved, To his widow and family, the Society would tender its warmest sympathy and sincerest condolence, feeling sure that they may find comfort in the thought that his memory will be cherished by the profession of which he has been so useful a member.

Resolved, The Committee would recommend that this memorial be spread upon the records of this Society, and that the Secretary be instructed to have a copy of the same sent to his sorrowing family.

Respectfully submitted,

J. W. Wassall,
Chas. P. Pruyn,
Truman W. Brophy.

The report was adopted, the resolutions ordered placed on file, and the secretary instructed to send a copy thereof to the family of the deceased.

Dr. Taggart moved that a committee be appointed to draft resolutions commemorative of Dr. J. S. Reynolds, of Monroe, Wis., deceased.

The President appointed as such committee, Drs. C. A. Kitchen, W. H. Taggart and J. A. Dunn, who subsequently reported the following:

WHEREAS, Since our last annual convention death has entered and taken from the ranks of our corresponding membership, Dr. J. S. Reynolds, of Monroe, Wis., a prominent member of the profession in his own State, an active member of its State society, and a member of its board of dental examiners, whose interest in the advancement of his chosen calling led him to visit other state conventions and participate in their proceedings.

Resolved, That his genial, courteous deportment made for him many warm friends in our Society and we all most sincerely regret our loss.

We extend to the widow and friends of the deceased our warmest sympathy and condolence, knowing that they will take comfort in the thought that his memory is pleasantly cherished by the members of the profession of which he was a worthy and honorable member.

C. A. KITCHEN,
W. H. TAGGART, } Committee.
J. A. DUNN.

Adopted.

The Secretary read a communication from Dr. E. E. Cady, of Chicago, offering his resignation.

On motion, this was accepted.

A communication was read from the President and Secretary of the Nebraska State Dental Society, asking that Dr. Ottofy be permitted to read at their approaching meeting the paper on "OPERATIVE DENTISTRY," to be read at this meeting and to be published in the Transactions of the Illinois State Dental Society.

On motion, the request was granted.

The Secretary read a communication from Dr. J. M. Hurtt, a member, now in California, expressing his kind wishes and personal obligations to the Illinois State Dental Society.

Dr. Ottofy moved that a telegram of greeting be sent by the President and Secretary to the State Dental Society of New York, now in session at Albany.

It was so ordered, and the following despatch was sent:

CAIRO, ILL , May 9th, 1888.

DR. NORMAN W. KINGSLEY, *President New York State Dental Society:*

The Illinois State Dental Society sends greeting: We are having a good meeting, and wish you success in yours.

(Signed by President and Secretary.)

The following reply was received:

ALBANY, N. Y., May 10th.

TO C. B. ROHLAND, *President Illinois State Dental Society:*

New York to Illinois, Greeting: Culminating effort of our law committee just signed by the Governor.

NORMAN W. KINGSLEY, *President.*

J. EDWARD LINE, *Secretary.*

The Secretary read a letter from Dr. C. R. E. Koch, Secretary of State Board of Dental Examiners, requesting that an advisory committee be appointed to confer with them, from time to time, on matters relating to the interests of the profession in Illinois.

On motion, the request was agreed to and the following named made the committee: Drs. J. D. Moody, T. L. Gilmer, Charles Henry, J. J. Jennelle and C. F. Matteson.

The Board of Examiners recommended for active membership the following named:

B. D. Wikoff, D. D. S., Chicago.
G. W. Entsminger, D. D. S., Carbondale.
J. E. Keefe, D. D. S , Chicago.
J. E. Hinkins, D. D. S., Hyde Park.
C. W. Lewis, D. D. S., Chicago.
E. M. Cheadle, M. D , D. D. S., Murphysboro.
J. G. Dickson, Carmi.
P. H. Chambers, Fairfield.

The candidates were balloted for and all were elected.

The report recommitted to the Board of Examiners Tuesday

was again presented, with a supplement containing the information called for with reference to those recommended for corresponding membership.

The report was accepted, and the names ordered to be placed on the roll of corresponding members.

Dr. Patrick read his paper entitled, "Dental Morphology and the Etiology of Irregularities."

The subject was discussed by Dr. Black.

Dr. Patrick replied, and the question was passed.

It was moved that the reading of Dr. Ottofy's paper on "Operative Dentistry" be postponed till the next session.

Carried.

Dr. Noyes moved that a committee be appointed to witness Dr. Patrick's dissections of fetal jaws on Thursday, and report their observations to the Society at this meeting.

Carried.

The President appointed Drs. E. Noyes, L. L. Davis, G. V. Black, J. D. Moody, A. W. Harlan, J. W. Wassall and T. L. Gilmer, as the committee.

Dr. Taggart moved that a committee be appointed to solicit aid, and take such steps as may be advisable in resisting the so-called Crown and Bridge suits.

(The President, at a subsequent session, appointed Drs. W. H. Taggart, J. N. Crouse, J. W. Cormany, C. R. Taylor, K. B. Davis, E. B. Call, W. P. Richards, Chas. Henry and J. Frank Marriner.)

Dr. Harlan moved that in accordance with the suggestion made by the President in his Address, a committee be appointed

to revise the pamphlet published some years since by this Society, entitled: "THE TEETH."

Carried.

The President named as the committee, Drs. E. Noyes, Geo. H. Cushing and E. D. Swain.

On motion of Dr. Cushing, the President and Secretary were authorized to fill out certificates for any members who may wish to attend the next meeting of the American Dental Association, as delegates from this Society.

The Society then adjourned.

EVENING SESSION.

The Society was called to order at 8:15 by the President.

The minutes of the afternoon session were read and approved.

The committee on infractions on the code of Ethics reported that no violation calling for action had come to their knowledge since the last annual meeting.

Dr. Brophy, chairman of the committee appointed to solicit funds for the prosecution of scientific research in Europe by Dr. Black, reported that the plan proposed having from various causes become impracticable, the committee recommended that the money now on hand be returned to the contributors.

The report was accepted and the committee discharged with the thanks of the society.

Dr. Carroll gave his lecture on the casting of aluminum plates, using his new furnace and casting a plate in demonstration of his methods.*

---

*This lecture having been published in substance by various Journals, does not appear in the Transactions. PUBLICATION COMMITTEE.

Dr. Ottofy read his paper entitled, "Operative Dentistry".

The discussion of Dr. Ottofy's paper was opened by Dr. Wassall and continued by Drs. Taylor, Greene and Crouse.

The Society adjourned at 11, p. m.

THURSDAY, MAY 10.

THIRD DAY—MORNING SESSION.

The morning was devoted to Clinics. See Report of Supervisor of Clinics.

AFTERNOON SESSION.

The Society was called to order at 2:30 P. M. by the President.

The minutes of the preceding session were read and approved.

Dr. Harlan moved the appointment of a committee to memorialize Congress that import duties be removed from all dental instruments and goods.

Carried.

The President appointed Drs. A. W. Harlan, C. A. Kitchen, C. R. E. Koch, C. F. Matteson and J. F. Marriner.

Dr. Cormany moved that a committee be appointed to secure, if possible, a legislative act relieving dentists from jury service.

After some discussion the motion was lost.

Dr. Harlan moved that the Treasurer be authorized to pay

all duly authenticated bills relating to the expenses of this meeting.

Carried.

The Examining Board recommended for Active Membership:

J. F. Cummins, Galconda.
J. M. Sprinkle, Nokomis.
C. H. Shafer, Anna.

Their names having been duly posted through one session, the candidates were balloted for and elected.

(Dr. Sprinkle did not qualify.)

Dr. Gardiner moved that the regular order be suspended to permit the reading of a paper by Dr. Ames, and the Report of the Supervisor of Clinics.

Carried.

Dr. Ames then read his paper entitled, "Amalgams."

Dr. Richards, Supervisor of Clinics, read his report.

The discussion of "Amalgams" was opened by Dr. C. R. Taylor; that on "Operative Dentistry" by Dr. Crouse; and continued by Drs. Cushing, Reid, Pruyn, Harlan, Noyes, Sitherwood, Swain, Ottofy, Green, W. N. Morrison, Moody, Newkirk, A. W. Freeman and R. N. Laurance.

This discussion also included remarks upon the Clinics and the Supervisor's report.

Dr. Harlan offered the following resolution:

Resolved, It is well known to the members of the Illinois State Dental Society that the profession of the State is now organized into ten distinct Societies, all engaged in furthering scientific research and perfecting their members in the technique of their practice. A portion of the work being done is due to the encouragement given to dentists by this society in the organization of new societies. In view of the good work being done by the various local societies, in stimulating members of the profession to engage in society work, the Illinois State Dental Society, now in session, is pleased to convey to

the officers and members of the various local societies their appreciation of the interest shown by them in furthering the advancement of dental science in the State of Illinois, and the members of this Society, one and all, bid them God speed in their work of raising the status of dentistry, to a proud position in the scientific world.

Adopted.

Dr. Cushing moved that when we adjourn, we do so to meet at the Rink to take tea with the ladies of the Episcopal church, who have invited us.

Unanimously approved.

Dr. Moody then read his paper entitled: "Some Main Points Concerning the Conservative Treatment of Teeth, whose Pulps are nearly or quite Exposed."

Dr. Patton, Chairman of committee appointed one year ago, to obtain information as to the question of holding the 25th annual meeting on a Mississippi river steamboat, reported that the committee had found the proposed place to be impracticable. The report was accepted and the committee discharged.

The Secretary called the Roll.

The Society then adjourned.

THIRD DAY—EVENING SESSION.

The Society was called to order by the President at 7:40 P.M. The minutes of the preceding session were read and approved.

The committee appointed to confer with the State Board, made a report through the Chairman, Dr. Moody. It was recommended that the Society appropriate two hundred and fifty dollars to the use of the Board in case of necessity.

The appropriation was voted.

The Board of Examiners recommended for Active Membership, A. D. Penny, of Chester, Ill., whose name had been duly posted.

A ballot resulted in his election.

Dr. Harlan, Chairman of the Executive Committee of the American Dental Association, extended an invitation to the members of this society to attend the joint meeting of the A. D. A. and Southern Association at Louisville, August 28th.

Dr. Ottofy moved that there be a committee appointed to examine the skulls in Eastern Museums of the United States and report at next meeting.

The motion prevailed and the President appointed as the committee Drs. Louis Ottofy, G. V. Black and Jno. J. R. Patrick.

Dr. W. A. Johnston then read his paper entitled, "What Shall We Do With Inflamed Pulps?"

The discussion of the two papers last read was opened by Drs. Harlan and Crouse, and continued by Drs. Wassall, Gilmer, Cushing, Morrison, Keith, of St. Louis; Rowland, of Tennessee; Noyes, A. W. Freeman, Townsend, Taggart, Cummins and Stevens.

The subject was passed.

The paper of Dr. Haskell entitled, "Prosthetic Dentistry," in the absence of the essayist, was read by Dr. Harlan at the request of the Secretary.

The discussion was opened by Dr. Swain and continued by Drs. Taylor, Ames and A. W. Freeman.

Dr. Wassall moved that the election of officers be made a special order for to-morrow, Friday, morning, following miscellaneous business.

The motion was lost.

The society adjourned to meet at 9 o'clock Friday morning.

FRIDAY, MAY 11TH.

FOURTH DAY—MORNING SESSION.

The Society was called to order by the President at 9 A. M.

The minutes of the preceding session were read and approved.

The President appointed on Committee of Dental Science and Literature to succeed Dr. Hanaford (term expired), Dr. J. D. Moody, of Mendota; Committee on Dental Art and Inventions, to succeed Dr. Magill (term expired), Dr. W. B. Ames, of Chicago.

Dr. Marriner read his paper entitled, "Making and Tempering Instruments."

The discussion was opened by Dr. Cushing, continued by Drs. Morrison, of St. Louis; Cormany, Taggart, Nelson, A. W. Freeman, Swasey, and closed by the essayist.

The subject was passed.

Dr. Wassall moved that the election of officers be made the special order for 12 o'clock.

Carried.

Dr. Patrick gave a lecture, illustrated by charts and the crayon, on "The Rationale of Constructing and Attaching Artificial Crowns to the Roots of Teeth."

For lack of time the subject was passed without discussion.

A supplemental report of the Committee on Dental Art and Inventions was read by Dr. Marriner.

Also passed without discussion.

Dr. Black made some remarks to the Society expressing his

appreciation of courtesies extended to himself and regrets for his inability to carry forward the plans of one and two years ago.

Dr. Noyes introduced the following resolution of thanks:

Resolved, That the members of the Illinois State Dental Society, one and all, desire to express their hearty thanks for and acknowledgments of the kindness and generosity of Capt. W. P. Halliday, the owner of the Opera House, for giving us the free use of it for our place of meeting. That we are sensible of our obligations to the ladies of the Episcopal Church, who have inconvenienced themselves to give us an excellent place for our clinics and won our admiration by delightful entertainments; that we tender our thanks to Mr. Parker, manager of the hotel, for his untiring and successful efforts to make us comfortable, and to the railroads that have given us excursion rates, and in some cases unusual accommodation; to the newspapers whose reports of our proceedings have been admirable, and to the city authorities and citizens of Cairo for their cordial hospitality and many acts of kindness. We especially thank Dr. Jennelle, through whose efforts many of these favors have been obtained; and we thank our own officers and committees whose efforts have made the meeting successful.

Unanimously adopted.

Dr. Noyes, chairman of the committee appointed to examine Dr. Patrick's dissections reported as follows:

Your committee have seen the dissections of the jaws of young pigs, as shown by Dr. Patrick, and found the appearances to the unaided eye the same as described in his paper.

Dr. C. Stoddard Smith offered the following preamble and resolutions:

WHEREAS, The present State dental law was passed some years since, and is markedly deficient in many respects causing it to fail to accomplish the objects desired, especially in regard to the means of enforcement; and

WHEREAS, The Illinois Legislature will meet the coming winter; therefore

Resolved, That a committee of five be appointed by the President now in office, one of whom, and not more than one, shall consist of some member of the present State Board, to be called the Committee on Legislation. This committee is instructed to carefully consider the subject of Dental Legislation by a comparison of the laws of the different States, and by correspondence with the proper parties in such states with a view to ascertain the best form of the desired legislation; and it shall be the duty of such committee, after such deliberation, to draft a bill and present it to the next Legislature, and by all proper means to endeavor to secure its passage. This committee is hereby empowered and

instructed to employ competent counsel in this matter, to the end that such proposed legislation may be legally and constitutionally sound. And they are specially instructed to endeavor to secure from the State as recommended by the Governor, some appropriation or other means whereby a fund may be created for the enforcement of the law if passed. This committee is instructed to incorporate in the proposed legislation the provision that no member of the State Dental Board shall be in any manner connected with any dental college; and be it further

Resolved, That the members of this Society be requested to bring this matter to the notice of their senators and representatives, and urge the necessity of the proposed action and to support this committee in every way in securing the desired ends.

Dr. Wassall objected to the adoption of the resolutions, as in his judgment they cast a reflection on the State Board.

The resolutions were adopted.

The President appointed as the committee Drs. C. Stoddard Smith, K. B. Davis, Chas. Henry, J. J. Jennelle, C. R. E. Koch.

Dr. C. Stoddard Smith offered the following amendment to the By-Laws:

Change the last section of the order of business (on page 16) relating to the election of officers to read: "This order shall be followed at each daily session. The election of officers and selection of next place of meeting shall take place on the second or third day of the session, the hour to be fixed by the Executive Committee or by vote of the Society, only that it shall not be held on the last day of the meeting. But the newly elected officers shall not be installed until the close of the session."

The hour of twelve having come the Society proceeded to the election of a place of meeting and of officers.

There were placed in nomination Chicago, Mattoon, Bloomington, Quincy, Lake Bluff and Rockford.

On first ballot Quincy was selected.

The election of officers was then proceeded with, resulting as follows:

For President,—George H. Cushing.
Vice-President,— J. J. Jennelle.
Secretary,—Garrett Newkirk.
Treasurer,—T. W. Pritchett.
Librarian,—W. B. Ames.

Dr. Cushing was elected by acclamation, and all the officers on first ballot.

The nomination of Dr. Wassall as member of the Executive Committee to succeed Dr. Taggart (term expired) was announced and confirmed.

The nomination of Dr. C. N. Johnson as a member of the Board of Examiners to succeed Dr. Swain (term expired) was announced and confirmed.

Drs. Noyes and Jennelle were appointed to conduct the newly elected President to the chair.

He said:

"GENTLEMEN—For the honor you have done me I can only say, I thank you."

The retiring President made brief remarks thanking the members of the society for their courtesy and support.

President Cushing made the following appointments:

Supervisor of Clinics—Frank H. Gardiner.

Committee on Publication—Edmund Noyes, J. W. Wassall, with the Secretary.

Committee on Infractions of the Code of Ethics—K. B. Davis, T. G. Wonderly, J. J. Jennelle.

Dr. Gardiner moved that a vote of commendation be given to those who have opened the various discussions at this meeting for doing so orally.

Agreed to.

Dr. Crouse moved that a vote of thanks be given the retiring officers and the Executive Committee.

Agreed to.

It was moved that the Executive Committee be empowered to appoint a local committee of arrangements for the next meeting.

The motion prevailed.

On motion the President was appointed to deliver the next Annual Address.

The minutes of the present session were read and approved.

On motion the Society adjourned to meet in Quincy the Second Tuesday in May, 1889.

GARRETT NEWKIRK, *Secretary.*

ADDRESSES, ESSAYS AND DISCUSSIONS.

ANNUAL ADDRESS.

BY THE PRESIDENT, DR. C. B. ROHLAND.

Gentlemen of the Illinois Dental Society:—Our Twenty-fourth annual meeting finds us assembled within the dykes of historic Cairo, the first time in the history of the Society that its meetings have been held south of Jacksonville. In the twenty-three years of our sojourn in the northern part of the State, those of the profession with whom we have come in contact have mainly been the ones interested. Hence, so far, our membership has principally come from that section. Egypt has practically been a barren waste to us. A section of territory equal in area to nearly one-fourth of the entire State, with a population of over 500,000, and containing within its borders nearly two hundred dentists, has heretofore sent us but a beggarly corporal's guard as its quota. It is useless to say that there should have been professional spirit enough among these two hundred dentists to prompt them to seek us. That is true enough, but the average practitioner, in the press of business and the calls of family duties, finds it but too easy to drop into a sort of professional coma, and unless specially stimulated always thinks when the time for society work comes around he will go next time. And it too often always remains "next time," until even the desire fades out. As, therefore, the mountain will not go to Mahomet, why then Mahomet must go the mountain. That great good has already been accomplished I am in a position to testify to. The mere announcement of the contemplated meeting of the State Society seems to have put new life into the Egyptians. The spirit and enthusiasm manifested at the meeting of the Southern Illinois Dental Society at Centralia, last

month, bears witness to this. That the meeting here will result in immediate large accessions to our membership, or even in a very largely increased attendance from this section is, I imagine, not to be looked for at once. It took years to work up the North, with all its advantages of numerous populous towns and its network of railways. Rome was not built in one day, neither was the Illinois State Dental Society. However, should this meeting terminate without even receiving one additional Egyptian within its fold, it will not have been without good to those it means to reach. It will be as a stone dropped into the placid lake, the waves of whose influence will keep acting and re-acting on each other long after this present meeting will have passed into history.

Society meetings exert a two-fold influence—they reach both the profession and the public, and not the least of the good accomplished by them is their influence on the people in an educational way. Dental societies, in any community, are followed to a greater or less extent by a more intelligent public sentiment, a better appreciation of what dentistry really is, its aims, its scope and what to expect from it. Their influence in this direction would be enhanced by devoting part of the time to lectures or discussions on subjects calculated to interest the public, and to which they should be specially invited. It seems to me that one evening during the meeting could be profitably devoted by our societies to public exercises with this object in view.

One great bar to all professional advancement, always has been, and still is the collossal ignorance of common people as to the simplest dental truths.

This subject, involving as it does that of popular education, has been so frequently commented on, on just such occasions as this, that it may perhaps be said to have acquired the right to be dubbed, in the vernacular of the vulgar, a veritable chestnut; a most ancient chestnut, perhaps, but it is, nevertheless, one with the burr on, that constantly in a most aggressive and uncomfortable way pushes itself to the front to the discomfiture of the average practitioner. I say the average practitioner, for the dentist whose field of labor lies principally among the wealthy and intelligent, who attend to their dental duties as a matter of course, who insist upon the best and duly appreciate it, hardly realizes the extent of

this criminal ignorance and apathy among the masses, and how like a wet blanket it serves to dampen the enthusiasm and energy of the conscientious dentist and frustrate his most skillful and painstaking efforts. At times one feels it to be a veritable stone wall in the path of success. For twenty years have I labored in the same community trying to the best of my ability to disseminate sound, orthodox dental truths; trying to teach the great importance of the dental organs to health and happiness, the care they should have from infancy up, the work they should do that artificial substitutes cannot possibly do, and the necessity of seconding the dentist's skill when needed with intelligent appreciation. Some of the seed sown has borne good fruit, I know. But when I am called on, day in and day out, year after year to combat the same errors, the same criminal undervaluation of and indifference to one of God's best gifts, and find my best efforts rendered nugatory by those whom I am trying to save in spite of themselves, I sometimes feel like exclaiming, "How long, O Lord, how long!" Small wonder that at times when the liver is at fault and the world generally looks more or less bilious, discouragement should come, and the weary laborer should feel it to be useless to try to dam—the Mississippi.

I am not a pessimist, however, by any means. If you or I, my friend, were alone engaged in this work, the task might well appear too great, but with us others are already working side by side, and soon, we hope, will be the entire organized profession. The leaven is spreading slowly enough to be sure, but spreading nevertheless.

I have called this the one great bar to professional advancement, and I know of no other that is such a drag to us. The dental world, it is true, has made immense strides, burdened with the mighty weight of a laggard public appreciation. What could it not have accomplished had it received the stimulus of an advanced and intelligent public sentiment? Let the public once see and understand and demand, and the problem of professional advancement will take care of itself. Knavery, and quackery, and phlegmatic inefficiency will have had their day. They would die of inanition. To this end must we labor with all the might and main its importance demands.

But how shall we proceed? I answer: First—As individuals, at home, both in and out of our offices, and next by concerted action in our societies. As individuals our business is not only to do the work brought to our hands, but to teach our patients as well. The people have no where else to look for light but to us. If we be dumb as oysters how can they learn the things of which they have neither the time nor the inclination to make a study? He falls short of his duty who considers his work finished when he treats dental diseases, fills teeth or makes artificial substitutes. The brother who falls into a pit must not only be lifted out of it, but must be shown how to keep out. Self interest demands that our patients be taught they have a duty to perform as well as the dentist, and that our best and most skillful efforts are likely to fail unless supplemented by careful subsequent attention.

Hence at the chair it is our duty to practice and preach. No operation should be permitted to leave our hands without instructions how to prevent a recurrence. No work should be finished without a demand that it be properly taken care of. No examination should be made without pointing a moral. It should be our effort to interest all who come to us with a view to cultivating their appreciation of their dental organs. This work should be supplemented outside of the office, when practicable, by occasional lectures in the local educational institutions including the public schools. The public prints might also be utilized for occasional series of "Popular Talks," or "Easy Lessons in Dentistry." This, if done in the proper professional spirit, with a due regard to the proprieties, would be perfectly legitimate and a most potent way of reaching the masses. Those who have not the necessary literary ability or time to compile such articles themselves can easily secure the publication in their local papers of articles appearing in our professional literature calculated to interest and instruct the public. The people have a right to demand this of us that they may not ignorantly sacrifice that which they would be most anxious to save did they but realize what its loss implied, or were they but posted on the possibilities of modern dentistry.

For years popular education has been a standard subject of discussion in our societies, but so far as I am aware no action was ever taken by any one of them looking towards the solution of

this vexed problem. At all events if anything ever was attempted it failed of fruition for lack of concerted action. It is most gratifying to know that the American Dental Association has at length taken this subject under consideration, and that this was brought about through the efforts and at the suggestion of a member of this society. It is conceded that in the rising generation lies our hope and that our school system, public and private, must be made to take a hand in this work. To this end the American Association passed a resolution that "Section 11 be directed to report at the next meeting of this association a plan or scheme for the introduction of a course of elementary instruction in dental histology, anatomy and hygiene in the public schools." This report is to be submitted at Louisville, in August next, when it will have the advantage of the joint consideration of both the American and Southern associations. We have every reason to look for practical results.

The task, however, of engrafting dental instruction into our school system so as to secure its general adoption, is no easy one. One or two societies cannot accomplish it. A hundred resolutions will not bring it about. It will need the united co-operation and energetic work of the entire organized dental profession. To this end every society in the country should take up the subject, endorse some definite plan to be agreed on generally, and by a long and strong pull altogether more will be accomplished in a short time than by years of desultory talk.

In what shape our school system is to be approached I shall not here attempt to discuss. My predecessor, Dr. Magill, last year made the very excellent suggestion that text books should be introduced on our specialty. If we can succeed in having this done, it will be a very effective way of reaching certain grades. But we need not wait so long before bringing this subject into the curriculum. Neither will it be necessary to arouse the antagonism we should naturally meet with to the multiplication of text books. We should begin in the primary schools—in the kindergartens. The simple facts of dental anatomy and hygiene, suited to the comprehension of the little ones, can be injected into the primary books and methods of instruction already in vogue. The spellers and readers can be made to convey information and arouse interest,

U. OF ILL. LIB.

so that when the higher grades are reached these little pupils will bring to the consideration of the more advanced facts of dental science an already awakened knowledge and appreciation.

During the past year a number of important events have transpired which are undoubtedly destined to impress themselves indelibly on the future of dentistry. Among the most notable were the action of the American Medical Association in formally recognizing dentistry as a legitimate branch of the healing art, and admitting its duly qualified members with only the degree of D. D. S. to fellowship in its councils, and the Ninth International Congress with its fully organized dental section. Both these subjects have already been so fully discussed pro and con in our journals and societies that the profession may be said to be in possession of all the facts and to understand fully their significance. I should therefore pass them by did not their importance and possible future influence seem to demand at least some brief mention on such an occasion as this.

The ever present, ever fruitful subject of the relations of dentistry to medicine was again brought to the front by the action of the medical profession just alluded to. This subject has been discussed since dentistry first took shape and form, and will probably continue to be discussed until the end of time. Like Banquo's ghost it will not down, and like its immaterial prototype this shadowy question is doubtless destined to influence future events. I am not one of those who approved "crooking the pregnant hinges of the knee" to our medical brethren and begging for recognition. When physic snubbed the founders of dentistry and told them she knew them not, I believe our fathers did the wise and manly thing when they sturdily went to work and wrought out their own salvation independently. The snub did not in the least alter the truth of the relations existing between the practice of medicine and that of dentistry. It was, perhaps, a most fortunate circumstance, in that it threw this healthy child on its own resources, cut it loose from ancient grooves and traditions and enabled it thereby to grow and thrive with a rapidity that has made it the wonder of the world.

But that we have made ourselves, and practically reconstructed the old materia medica, therapeutics and pathology to our

own use, and added new branches, does not change, in the least, the truth of the relations existing between the practice of the two. Neither do I believe it wise or manly to deny the relationship and refuse the proffered hand just because of a former snub. The recognition, to my mind, was one not lightly to be sought, but now that it has taken the form it has the question to be asked should be, Does this not impose upon us new obligations? Will we not feel spurred on to widen and deepen the foundation of our science so as to make us beyond a question finally the peers of our medical brethren even in their own chosen field of general medicine? Will this not strengthen the hands of those who believe in elevating the standard of dental education until the D. D. S. shall rank higher than A. M. or M. D., because it will practically include them both? In this sense, then, will this not be a great step in advance?

Should not anything and everything be welcomed that tends to put us on our mettle and gives us an additional incentive to elevate our standard?

Whatever our individual opinions may be as to whether dentistry is a distinct profession or only a subdivision of general medicine, this action comes as a timely recognition of the present status of dental education. The resolution, as passed, does not imply that the D. D. S. is duly qualified to practice in all the departments the M. D. covers, or, indeed, that the M. D. is qualified to practice dentistry, but it does imply that our dental colleges have at length reached the point which justifies the medical profession in opening the doors of its associations to duly qualified dental graduates. We give up nothing of our independence by accepting the situation. We certainly lose nothing in standing, but quite the contrary. We practically subscribe to the same code of ethics already, and we shall still keep up our separate societies and organizations. We are only put into a new position of responsibility; and it becomes us to respond to it by raising the standard of dental education higher and higher, until for general and special culture and attainments dentistry will be the peer of any calling in the world.

With the Ninth International Medical Congress it will not be necessary here to occupy much of your time, not because of its

lack of interest or importance, but because as I have said of its having already been so thoroughly canvassed. We may say of it briefly, however, that in spite of the unfortunate feuds which came so near making it an ignominious failure, it did good work. The dental section which, as you are aware, was the best organized, best attended and most enthusiastic of all the sections, was just successful enough to show what might have been had the whole profession taken hold of it with its usual energy. I do not wish to be understood as criticising those distinguished men who held aloof. There was much to cause this attitude, and it must be admitted that there was a time when it seemed extremely problematical whether one's reputation would suffer or be enhanced by having anything at all to do with it. That mistakes were made is conceded, but these can and doubtless will be remedied in the future, the conditions under which the section was organized and conducted having much in them to give excuse. That much remained to be desired does not alter the fact that dentistry scored a most decided success at Washington, that it enhanced its reputation, added to its store of knowledge and made an indelible red letter mark in its history.

I beg your indulgence for a few moments longer while I briefly allude to one or two subjects which may, perhaps, in your judgment, call for some consideration before the close of our deliberations.

At a meeting of the First District Dental Society of New York, held last June, steps were taken to resist the "threatened suits for damages and injunctions if letters patent for alleged improvements in dentistry are not recognized," and the co-operation of other dental societies was solicited. By these "threatened suits," of course, were meant the bridge and crown suits. In response resolutions of similar import were adopted soon after by the American Academy of Dental Surgery of New Jersey, also by the New York Odontological Society and the Minnesota State Dental Society. Since then a number of others have fallen into line and put themselves similarly on record. It seems to me all important that these suits should not be permitted to succeed through our own apathy, or that a few should be called on to bear the entire burden of defense. Did these patents confer only just

rights upon their owners, I for one should not countenance resistance merely for the purpose of relieving ourselves of a burdensome taxation regardless of the equities of the case. But the profession is practically a unit in considering the bridge and crown patents as illegal and most unjust, and as granting a monopoly to those who have not the shadow of a claim to original invention. Hence these claims should be most vigorously combatted, but they should be combatted by the entire organized profession or not at all. The lessons of Josiah Bacon's time should not be forgotten. I commend this subject to your serious consideration for such action as you may think desirable.

This being our twenty-fourth annual meeting some action should be taken in reference to the preparations for our twenty-fifth anniversary, which, for many reasons, it is desirable should be a notable event, not only in the history of the society, but the profession as well. We occupy to-day an enviable position among dental societies, and it is meet that our twenty-fifth anniversary should be duly celebrated. Give this subject your thoughtful attention during the meeting, so that you may bring to its consideration some well digested plans. I have but one thought to offer in this connection. It has been suggested that the anniversary be observed by laying aside labor for the once and making it a season of social enjoyment. I trust this will not prevail. Rather let the meeting be celebrated for doing more and better work than ever before than for its feasting and merry making. The one thing in the record of our society it has to be proud of—indeed the one characteristic of the Illinois State Dental Society is the strict attention to business during its meetings. I do not wish to be understood as favoring the entire exclusion of social enjoyment; but an anniversary meeting, however, with this feature most prominent, would not be a fitting anniversary of the Illinois State Dental Society.

Your supervisor of clinics last year, Dr. C. F. Matteson, in his report recommended in effect that some provision should be made whereby distinguished members of the profession from outside the State who might be induced to be present to instruct the society could be entertained as guests at her expense. In this way we might have the presence and instruction of one or

more distinguished specialists at each of our meetings. The expense of their entertainment would of course be a mere bagatelle compared to the time and money expended in coming, and it would not be offered as a money consideration. But the society would honor both itself and its guests by the compliment, which would doubtless be appreciated as such.

I am well aware of the difficulties in the way of the successful use of such a provision under present conditions, but the idea is not an impracticable one and could be made to work for good to all concerned.

Another subject brought up at our last meeting I allude to here, with the hope that it may not be lost sight of. I refer to the exemption of the profession from jury duty. Practically the reasons for relieving the dentist of this duty are almost as strong as those that apply to the physician. We both relieve suffering that clamors for instant attention. Neither of us can delegate our work to other hands in our absence. We both practice the healing art and now that the bars are down and we browse along side by side with the rest of the medical cattle in the green pastures of physic, there should not be much trouble in securing the coveted exemption.

Gentlemen, allow me to express to you my deep appreciation of the honor conferred in electing me to preside over your deliberations at this time. I approach the performance of my duties with great diffidence, and should do so with considerable trepidation did I not feel assured that you will kindly extend to me the same charity and forbearance you have ever been so willing to extend to inexperience. In 1874, at Jacksonville, you conferred upon me membership. Thirteen years later, at the same place, you added the cap sheaf to my obligations by conferring upon me the highest office in your gift. The honor was so unlooked for, came so suddenly, that what few wits I keep about me for ordinary occasions forthwith "took to the woods," went woolgathering, so to speak, and I am afraid did not return until some time after adjournment. Pardon me for speaking of myself, but I do it to point a moral. Had it not been for the kind assistance and advice of some of the older and more collected heads about me I am afraid I should have made but a sorry mess of my

duties at that time. Within about twenty minutes I was called upon to make a number of important appointments, some of them having considerable to do with the successful administration of affairs. That my selections turned out eminently wise and satisfactory I assure you, in the strictest confidence, of course, was not by wisdom but good luck. Here, then, is a custom that I think might well be changed. Either all the appointments should be made by the outgoing president, or the newly elected president should not be required to make them until after ample time for consideration and consultation.

I thank you for your patience.

REPORT OF COMMITTEE ON DENTAL SCIENCE AND LITERATURE.

To the Illinois State Dental Society:

GENTLEMEN:—In planning their report, your committee has sought a division of labor as follows: General Practice, by the Chairman, Dr. M. L. Hanaford; Literature, by Dr. Louis Ottofy, leaving the remainder of the field to Dr. T. L. Gilmer.

In the department of general practice one comprehensive question suggests itself as proper for our consideration, which, though always old, is yet ever new.

Are we scientific in the things we do, as well as in the things we say? Are we successful in our operations day by day? Is there harmony between our theories, our practice and our results? To these questions all candid minds must answer, "No, not yet." Then every dentist not already satisfied with his attainments—for there are few dentists, who, like the Pharisee, thank God they are not as other men—will ask of himself whether he is making progress year by year. The large body of our profession—certainly all who have the honor to belong to this society—could answer unhesitatingly, "Yes, we are slowly eliminating antiquated methods, exploded theories, and endeavoring to free ourselves from the ruts of empiricism." As for results we save permanently hundreds of teeth which a very few years ago would have been the prey of the forceps, and we make comfortable and comparatively useful many others which might be classed, according to a well known teacher, as "forlornites." The operation of crowning defective teeth and roots comes to our aid in a large and increasing number of cases. Two years ago mention was made in the report of this committee of the need of some more effective and scientific method of preparing roots for bands, and in the discussion which followed various suggestions were made and individual methods described. Since that time the journals have contained

frequent articles upon crowning and kindred operations, and all insisting upon the importance of shaping the root so us to taper uniformly upon all sides, without shoulders, from a point as far under the gum as the band or ferrule is to reach.

To a person absolutely without experience most of these descriptions make this part of the operation seem a simple affair. They remind one of the time when the use of the rubber dam was not well understood, and we used to hear Dr. A. or Dr. B. say that he never had any trouble in its application; it always went on with a snap and never came off in the midst of an operation. But alas for our faith in our professional brethren, when we come to try it the rubber dam does not always act kindly, neither is it an easy matter to shape a root properly and fit a band to it.

It is no sure sign that the operation has been thoroughly and correctly performed that the crown remains in position for years and does its duty fairly well. Are we sure that the upper edge is smoothly in contact with the root, that only the free margin of the gum has been lifted, and that every part of the crown and root cavity is perfectly filled with cement? Not quite sure. Then the operation is not what it should be, though it may stand for twenty years. During the last two or three years we have heard hints that from this source and that source there was to come a tool which should make it possible to do this part of the work with certainty, but up to this time no such tool is within reach. While all this is true, no progressive man will sit idly down and wait for some one to solve the problem but will, by any and all means at hand, strive to come as near his ideal as possible.

In the *Independent Practitioner* for November, 1887, was published an essay by Dr. James Truman upon the dental pulp, which in some of its arguments and deductions is a departure from former teachings upon this subject and merits our attention. That part of the paper which I wish to discuss briefly, is one of intensely practical character, namely, the relative value of an exposed vital pulp in cases of teeth having cavities of decay in inaccessible locations, and when a pulp capping might for varying reasons render the filling proper insecure. The question which we are compelled to decide in these cases, he states briefly as follows: In cases where the cavity approaches the pulp

chamber, the possibility or probability of inserting the filling without exciting serious irritation in the organ it contains, has not seemed to me the most important question. That, in most cases, with ordinary care is readily accomplished. The real question has seemed to be this: "Can we by so doing secure the best results?" Admitting fully the value of a vital pulp, he argues still that the probability of the permanence of the filling proper ought to be the question of first importance. If the effort to save alive this delicate organ renders it impracticable to procure a thorough preparation of the margins and a sufficient freedom from carious dentine, either from fear of encroaching too much upon the pulp, or from the bulk of the pulp capping material when in place, he would say the pulp ought to be sacrificed at once.

Temporary fillings for these cases are considered and condemned on account of their uncertainty.

The mere fact that a pulp is kept alive he would say is not important, unless it is thoroughly comfortable and well protected by a good, durable filling. We all recognize the fact that many pulps, although alive in the sense that they respond to the changes of temperature, do not properly perform their functions and are a constant source of discomfort. Such pulps the essayist considers are of no value. His conclusions are summed up in a sentence or two as follows, and they may also be taken as embodying the opinion of the writer, although they differ from those of many whose views are often quoted or expressed in the dental journals. "Much as I value a living pulp, I recognize that there are cases where devitalization is necessary preparatory to the insertion of a reliable preservative filling; that it is necessary in *some* cases, where we could avoid the mechanical difficulties encountered in securing the filling and satisfy the conditions deemed necessary to arrest decay, the salvation of the pulp would be reasonably assured.

There are other cases where from the condition of the pulp its devitalization is merely a question of time, and practically the question is narrowed down to this, "Shall we apply arsenic and devitalize in a few hours, or shall we attempt to preserve its vitality with the almost positive assurance that the same result will be reached within two or three years?"

This leads us naturally to consider that much talked of practice called "immediate root filling."

During the past year scarcely a dental journal has appeared without at least one article upon this subject, and the societies throughout the country have been busy over the same topic.

There has in this instance been no exception to the usual tendency to extravagant and sweeping assertions on the part of enthusiastic men.

By such the operation in question is made to appear too easy, too uniformly successful. Can it be possible that all we know, or thought we knew, of the treatment of devitalized teeth can be overthrown by a few dashes of the pen, as follows: C. Edmund Kells, Jr., *Dental Cosmos*, June, 1887: "To day a root is treated as a simple cavity--cleaned and filled at once, no matter what the condition."—"If the abscess is caused by the dead pulp and we remove that, from what source are we to look for further trouble? None."—"For the cleansing of the canals carbolic acid, c. p., and *nothing else* is used."

Here, you observe, we have the "whole thing in a nut shell," but we suggest as an appropriate heading for the article in question the oft quoted one, "Important if True."

What are the facts! My answer would be that the truly scientific practice will be found in the middle ground. Many roots may be cleaned and filled at once, but that all ought to be only an extremist can maintain. Indeed what necessity or justification can be found for attempting to fill at one sitting a septic root accompanied by pericemental inflammation is beyond comprehension. Of course the other extreme is equally to be avoided—that of over treatment and leaving a root unclosed too long.

For the management of these cases dependence must be placed upon thorough and careful instrumentation and an intelligent use of proper drugs.

This division of the report is already too long, and I only mention one other practical point which, although not new, is apparently not yet conceded its relative importance by a large number of dentists. I mean the combination metal fillings, notably the gold and tin combination. In the use of this material we have as nearly perfect control of the cervical margin as we can reasonably expect in any metal. A softness, almost plasticity, combined with sufficient hardness owing to chemical change, and

an antiseptic property all seem to unite to render this filling material almost ideal

But if the operator has ever cherished the fallacious theory that all gold fillings ought to be of a uniformly solid mass like coin, he will need to modify his ideas in that particular.

In the section of this report devoted to dental literature, but a few suggestions are deemed necessary by your committee. What we wish to say will be confined principally to that phase of the subject relating to periodical literature, its influence on general practice, the importance of the ceaseless study of and the contribution to the publications, especially designed for the use of dentists. A perusal of our entire periodical publications for one year will impress any one with the apparent lack of originality. While we are supplied with over twenty dental journals, much of their contents is copied and republished *an infinitum*, hence, while the literature seems extensive and profuse, the pages themselves are witness that the real and worthy contributions to science are meagre, and the separation of truth from error and progress toward perfection is slow.

There are now over sixteen thousand dentists in the United States. How many of them are contributors to our literature in one way or another? How many have ever recorded a thought or have given the slightest impetus to progress? This condition is not so much due to a want of ability and education as to a want of method, habit and training in literary matters. The lawyer is *nolens volens* obliged to keep record of his various cases, their progress and condition. He is continually compelled to consult authorities on matters affecting the status of certain legal points. This absolute necessity, from the nature of the case, makes of him in a certain sense a literary man. The minister is acknowledged to be a literary man, for he is or should be a student and scholar. The physician, too, is forced to cultivate habits of study, to observe and to record. Thus the study of certain phenomena in connection with unusual cases becomes a necessity and he, too, in some measure, is literary.

A busy professional career in our calling has a decided tendency to cultivate a mechanical turn of mind unfavorable to the cultivation of literary inclinations and habits. The cuts in adver-

tising pages of dental journals bring information in the line of novelties; the clinic at the society offers opportunities to observe difficult or unusual operations; and, generally, what is thus imbibed, while its value may be enhanced by reading and study resulting in thought and originality, is considered sufficient. In this way many practitioners attain fair and some even marked success without having ever contributed to the literature. Every dentist should understand first how and what to read; second, how, when and what to write. The principal points well understood, there will be no difficulty in consulting authorities, or looking up questions bearing on any particular subject under consideration. Any one possessing these qualities will not be likely to call the attention of another practitioner to a subject eighteen months old, as our attention was called by a dentist to the use of sand paper disks after they had been in general use for a year and a half; nor will any one remove good gold fillings, whose cervical borders are made of gold and tin, in a belief that amalgam had been used, or that the filling has failed.

A dental practitioner should be supplied with at least three dental journals published in his own country, and, if at all possible, with one or more foreign publications. The question at once arises, "What journals shall I take?" The best manner to answer that question each for himself, is either by carefully examining sample copies of all the journals published, or, which is better, by subscribing for six months to each and every dental journal in the United States. This may be done at an expense of about $15. The publications should then be carefully studied when each for himself will reach a satisfactory conclusion. We are subject to dissimilar tastes and conditions, and we should read those journals which approach nearest our ideal of perfection, so that their being read throughout the year is insured. Writing for magazines, when well done, is one of the highest and most useful accomplishments and one by the means of which any person who has the interests of the profession at heart can do much toward elevating it. It is a safe rule never to allow those moments to pass when one is in the mood to write, or "when the spirit moves." Most dentists feel at times prompted to record their observations or to note down certain ideas entertained on topics with which they are

especially familiar, or in which they are particularly interested. On these occasions notes should be made for future reference and compilation. It is a good practice to have a tablet of paper in the operating case and jot down anything of interest, practical or theoretical, so often occurring or being presented to us while operating. In leisure moments these slips may be torn out and placed in envelopes labeled, "Operative Dentistry," "Tin," "Gold Filling," "Amalgam," "Saliva," or as the case may be. It is astonishing how soon by these means wholesome food for a paper is secured and how readily interesting points unknown to some, or which may readily escape from an erratic memory are preserved and made beneficial.

The literary beginner must not be discouraged by defeat when his manuscript is returned indorsed, "Declined with thanks," or when he hears of the final death and disposition of his "letter," the letter that never saw the light of day again. He must not permit such trifles to dampen his ardor; he should try and try again. As a general rule a communication intended for publication should be prepared with scrupulous care, for an error ever so slight, stares with a fierce, bloodless glare when put in unfeeling, unsympathetic type.

We trust, in passing this section of the report, that every member of the society during the coming year will, in addition to a close study of the literature, devote some of his time and talent with a view of increasing our general knowledge.

During the past year there have been but few facts added to those already known relating to histological subjects. Original investigation in this field is uninviting to the great majority. The results are not in all cases certain to bring the desired information, besides the laborious work necessary deters many. The result of Dr. Black's investigation of the periosteum and peridental membrane that has appeared in book form during the year is about the only original work at all conspicuous. Since the profession generally is familiar with it and appreciate its great worth farther comment by your committee would be superfluous.

The work of Dr. Stowell, while evolving no new facts, has in a clear and concise manner placed before the student the "microscopic structure of the human tooth." Formerly Dr. Stowell

held to the belief that the dentinal fibrils arose from the body of the pulp, but subsequent investigation has proven to him that they are processes of the odontoblasts. This conclusion brings him into harmony with the majority of the best investigators of the day.

IMPLANTATION.

We were promised that a solution of the method of attachment of implanted teeth would be forthcoming during the year, but thus far there have been no reports of observations made from microscopical sections of implanted teeth in combination with the adjacent tissue. Drs. Bodecker and Heitzman made a report before the First District Dental Society of New York of the appearance of a tooth extracted six months after implantation. *

In this report the statement is made that there is no "revivification of the dentine, cementum or pericementum." Beyond this the statement is made that implanted teeth are held in place mechanically. That is, bay-like excavations are cut out of the root and into these proliferations of granulation tissue is built. To arrive at a true conception of the subject, it will be necessary to make implantations in the jaws of lower animals, and when the teeth are firmly attached microscopical sections of the teeth and jaw will give the correct answer to the question.

The conclusion of Drs. Bodecker and Heitzman is more in harmony with known physiological facts than the theory of Dr. Younger, who believes that the peridental membrane is revivified, and that the implanted tooth bears the same relation to the surrounding tissue as do other teeth whose relation with the jaw has never been disturbed. This theory is much weakened, however, by the fact that teeth entirely denuded and polished have been implanted and have become quite as firm as those not thus treated. That the operation of implantation can be done with a good degree of success cannot be disputed, provided an operation be considered a success which lasts but a year, or a few years at most. Dr. Thomas, formerly of Detroit, was an enthusiast in replantation and transplantation some ten years ago, but after allowing

* The article by Dr. Bennett in the May number of the *Cosmos* in relation to this subject appeared too late for consideration in the report.

time to test his work he abandoned the operation since he found after four or five years the roots of teeth thus treated were absorbed and the teeth lost. Is there reason to believe implanted teeth will be more stable?

Drs. Younger, Ottofy, and others were written to for statements of successes and failures in implantation in their practice.

Dr. Younger did not respond. Dr. Ottofy sent a tabulated statement of all the implantations he has made, extending over a period of thirteen months. The result proves the operation, when skillfully performed, to be more successful and less hazardous than is generally supposed.

However, such results can only be anticipated when the greatest caution is observed in the selection of subjects, and when the utmost skill and care is exercised in the operation. The whole number implanted by Dr. Ottofy was eighteen. Three of these were for patients who were wholly unsuitable for the operation, leaving fifteen whose prognosis might be considered favorable. Of these fifteen twelve are absolutely firm and doing good service, while only three have failed. The ratio stands twelve successful to three failures, or eighty per cent. success to twenty per cent. failures. The tooth longest implanted has been in place fifteen months; and all with the exception of five have been implanted one year and over. This is certainly an excellent showing, but questions which the profession is asking are, "Will teeth thus tested last a sufficient time to justify the operation?" and "May not implantation, when performed by the average operator, produce as it has already in some cases many unfortunate results, and give a much smaller percentage of success than the above represents?"

The germ theory of disease still commands the attention of the dentist, and the utilitarian is asking the questions, "What good is coming to the profession through the knowledge possessed in regard to micro-organisms?" "Has there been any real gain in any direction from the fact of their discovery, cultivation and classification?" "Are dentists better able to treat the diseases of the teeth and jaws from the knowledge gained through the study and experiments of the mycologist?"

In answering these questions we may say all has not been

proven that has been claimed, but we do possess valuable facts the knowledge of which came through the agitation of this subject. For instance it is a well known fact that before we were fully aware of the relation which these organisms bear to specific disease, we frequently had unpleasant results in the treatment of pulp-chambers which contained post mortem elements of pulps of teeth which now we do not have, provided aseptic measures are employed. In the majority of teeth whose chambers contain dead pulps there is about the ends of the roots a certain limited tract of inflammation, which inflammation supplies a suitable cultivative media for certain species of microbes. If through the medium of the saliva, an instrument, or through the air a pathogenic organism, which under the circumstances has the power to eliminate a material that produces a specific poison be conveyed to this inflamed area, we may certainly expect the formation of an abscess. But with our knowledge and application of antiseptic treatment there need be but little fear of a sthenic inflammation following the treatment of pulpless teeth. This is only one instance of many where a knowledge of micro-organisms has proven beneficial. The reply attributed to Edison when asked if he had not discovered about all there is in electricity to be known, was that our knowledge of electricity is about as complete as the knowledge gained of a ten-acre field by viewing it through a half-inch augur hole. It is probable that our knowledge of these organisms is about as limited. There seems little doubt that microbes bear a causative relation to tooth decay, and that a further knowledge of them will be of immense value to the dentist.

M. L. Hanaford,
Louis Ottofy,
T. L. Gilmer.

DISCUSSION.

OPENED BY DR. BROPHY.

Dr. Brophy. Mr. President: I have not much to say upon this subject, but I think it is too important to be passed without debate.

I had hoped the Doctor (Dr. Ottofy) in his report would tell us how we could secure the better adaptation of gold to the irregularities of roots of teeth in adjusting artifical crowns, and how we could more perfectly prepare the roots to secure this adaptation.

I have never yet seen a properly constructed instrument to shape the roots of teeth with that certainty that will enable us to adjust a band correctly and accurately to all their irregularities. We see roots sometimes scooped out upon the side and so contracted at the neck that the cutting down of the root to make a band fit in these depressions and irregularities would so weaken it as to render it of very little value. Indeed the strength of the root would be destroyed, and the only way I can imagine that a crown can be properly adjusted to such a root is to have the band so annealed and soft that it can be burnished into these imperfections, or rather depressions or grooves, along between the roots or at a point just above the bifurcation of roots of bicuspids.

The preparation of roots, as mentioned in the paper, by simply cleaning them out and filling them as cavities is not, in my judgment, sound practice. The gentleman who undertakes that method of practice will get himself into trouble very soon in the majority of cases. This "immediate root filling" that is talked of so much in the journals will, I think, be talked of very much less in a short time. It is not sound practice, and those who indulge in it will often find themselves in trouble. The conditions present must be considered. We must know what is the matter and we must meet the emergency. We must know whether there be septic matter present, and if so we must have it removed. We should know whether there is an incipient abscess at the apex of the root with-

out a fistulous opening to treat the case correctly. When this method of immediate root filling is advocated in the journals by gentlemen high in the profession, I think it is productive of a great deal of harm. It leads young men into trouble. If a man far advanced in his professional career wishes to take upon himself the risk and responsibility of indulging in that practice it is all very well perhaps for him. But I do not like to see a young man start out in that way, because he will soon find himself adversely criticised, not only by his patients but by some of his professional neighbors. Patients do not always return. If they have a case of pericementitis produced by an "immediate root filling" they may call upon some other gentleman. I am somewhat conservative on the question of the management of roots of teeth, and I like to see them treated with that accuracy and care which have characterized our practice in the past. Occasionally a root may be immediately filled after the removal of pulp which has been devitalized by ourselves, and which has not decomposed and eliminated septic gases. But even in such cases I would prefer, and it is my practice, to make an application after removal, not filling the root immediately, reserving the filling of it for a day or two, until I have put it in a condition that I regard as more satisfactory—that is to say, after having destroyed as far as possible the living matter, the membrane which lines the cavity, and all the tissues of the pulp. And there is no application that I regard better in such cases than the 95 per cent. solution of carbolic acid.

DR. GARDNER. I should like, Mr. President, to raise a point of order. Dr. Brophy is ostensibly discussing the report on dental literature and science; but it seems to me his remarks would more properly come under the head of operative dentistry.

MR. PRESIDENT. The subject was spoken of in the paper and is a legitimate subject of discussion now.

DR. BROPHY. I so understood it. If I am digressing, I wish to be corrected, of course.

I only wish to say again that I do not approve of this practice we hear so much of now—immediate root filling. Not very long ago I heard a paper read about treating roots "in a mechanical way," disregarding wholly the septic materials that are there,

simply swabbing out the root and putting something in without regard to the influences of germs, etc. The less we talk about the matter from that standpoint the better it will be for the profession. We are advancing, not retrograding, and we want to treat these subjects conservatively. New modes of practice should not be adopted without the most careful consideration.

Dr. Harlan. My main thought when listening to the reading of this report, especially that portion of it relating to dental literature, was that the report was conspicuous for what it had omitted. There is no reference in it to the work of Dr. Talbot on the Irregularities of the Teeth; none to the work of Dr. Haskell; none to the second edition of Essig's Dental Metallurgy; none whatever to Dr. Clifford Mitchell's work on Dental Chemistry; none to Rymer's Hand-book for Dental Students, and other works which it is needless to enumerate to this intelligent body. My idea of the duties of the Committee on Dental Science and Literature has always been that it is their duty to search for and point out to those of our members who are, we might say, non-readers of the periodical dental literature of the day, those things which they may have omitted by lack of interest in it, which should be supplied to them by that committee; that it is no part of their business to discuss or criticize any method of practice that has been discovered, but to *report* that a new method has been proposed, or improved. These remarks are made with the kindliest feelings toward every member of the committee, and I say this publicly, at this time, to warn a future committee that probably, in the judgment of the members of this society, that will be regarded as a portion of their duty which hitherto they have always failed to perform. (Applause.)

Dr. Noyes. I think Dr. Harlan's criticism is a just one essentially; but I wish to say that, notwithstanding the criticism, this report comes nearer to what was intended when these committees were proposed than any report that we have had previously, and I congratulate you, and I congratulate the society, that both these committees are each year learning and taking up some additional portion of their duties; and pretty soon we shall have them doing what we desire of them, and adding a very valuable part to our proceedings.

The report suggested the question as to how much the scientific studies and added knowledge in certain lines, referring perhaps principally to the germ theories, have done for us in a practical way, preparing for our success clinically. It seems to me that they have done very much. It is true, that for a great many years we have been doing empirically the things which the latter scientific studies and discoveries now require us to do scientifically; and some persons may be disposed to question as to how much better it is to do them scientifically than empiricially; whether, if they are done, the results in practice are not just as satisfactory? One difference is that if we understand what we are doing, if we understand the nature, the sources and the effects of pus infection, for instance, to name a single item, we are more likely to prevent it, and much more certain what is going to happen after we have taken our preventive measures; and we shall obtain results with greater regularity and positiveness than we ever could when we simply put iodine and creosote into an abscess because we had found that it would cure it without knowing why, or anything in particular about it except that a cure would sometimes follow.

The whole line of this practice, it seems to me, has acquired a very great advantage and advancement in consequence of the better knowledge of these scientific matters.

DR. CUSHING. I have but a word or two to say, and that somewhat in the line of what has been said both by Dr. Harlan and Dr. Noyes, in the matter of criticism of the report for what it lacked. But I wish to say this, that it is evident the committee have never yet grasped the idea which caused the formation of this and the other committee. The language of the resolution would seem to be definite enough to instruct them:

"A committee on Dental Science and literature, consisting of three members, whose duty it shall be to report annually, on the first day of the annual meeting, on the progress of science and literature as appertaining to dentistry, and give a *resume* of all that may be new and important."

It seems to me that is definite; but it is evident that the committee have not read that since it was adopted. (Laughter.) But as Dr. Noyes says, this is the best report that we have had, and approximates what we hope to have by and by.

I was very much pleased with one part of the report, with reference to the suggestions to those who are not in the habit of contributing to the literature of the profession—younger members, and some of the older ones, too, who neglect that matter. The suggestions were very valuable, and if carried out will lead to something by and by which will be of profit to us all, I have no doubt. There can be nothing more important for practitioners in our specialty than the keeping of notes and memoranda, as suggested in the report. And when once kept, as recommended, it will be a very easy matter to prepare for publication or for reference at any time material which will frequently be of very great value, and which would otherwise be lost in the lapse of memory.

Excuse me, Mr. President, if I say a word more with reference to the work of the committees. I evidently am misunderstood as criticizing harshly what has been done; but my recollection of the creation of those committees is that they were expected to present to this society, in the matter of literature, suggestions to those who had not read everything that came along. They were not simply to tell us what new books had been presented during the year, but to suggest what would be desirable for the majority of the members to get and read. And so with regard to the matter of dental art and inventions. The committee were to present what was new and desirable in their estimation, and then we could discuss here what we pleased of the matters presented. They were to offer us the best to be had out of the year's productions.

Dr. Noyes. I believe I was the author of the proposition to create these committees, and I would like to say that one object before my mind in the first instance was that we might set six members of this society at work, in addition to those who were to prepare essays; that we might have six more who would be at work all the year through, for the benefit of the society; but I am satisfied now that they are coming to the appreciation of the work that was cut out for them, that is ready and waiting for them to attend to.

Dr. A. W. Freeman. I think Dr. Cushing has struck the keynote, when he says the committee were to present a *resume* of these various works. I certainly did expect to hear that at this meeting, and I am a little disappointed that I have not. But all I

want to say is, that in future we hope our committee, whoever they may be,—and two of them will hold over—will give us a little more information concerning the desirability of the various new books. Every man cannot afford to buy each new book that comes on the market; but the committee can give us suggestions which will be very valuable, such as Dr. Cushing has referred to, and which we can use as "pointers" in our selection. No man can well get along without four to six journals, but it would be quite an expense to buy the various books that have come out within one or two years; and I do not know but it might be well for this society to set apart a certain sum of money so that those who are on the committee shall not be subjected to burdensome expense in making examinations to determine what books they think worthy the attention of this society and of dentists generally.

DR. SITHERWOOD. I want to say just a word. I have always understood that this report was to be what in newspaper parlance would be called a "*review*," of dental literature and appliances that have come out during the year. But there is one part of the report I wish to heartily commend, and that is that among so many dental journals that are published each month, it is somewhat discouraging to find nearly the same matter in all of them—the transactions of this society and that society, some nearly a year old; nothing original, nothing new. I dislike to have so much chaff on my table, with so little good grain. It is not always so with other literature. Why should it be so in dentistry? Can't we have something new, and not have every dental journal filled up with similar reports from the same societies. Let us have something different, if not original, and not the same writings in all the dental journals. (Applause.)

DR. BLACK. Mr. President, I would suggest that in order to have such a change, dentists must write something for the journals.

DR. SITHERWOOD. Whenever they pay us as much in proportion as we get for operations they will get the writings; not before.

DR. WASSALL. Mr. President, I want to say just a few words in regard to books. Dr. Freeman thinks it is too much of an expense to buy all the dental literature that has been published in

the last two years. Possibly there are some who cannot afford this, but where it is possible, I think it will be one of the best investments a man can make. The men who write books put a vast amount of thought and experience into the work. When you buy books, you buy brains, other's brains; to what better advantage can you place your money. There are very few dentists who cannot afford to buy the books which have appeared on dental subjects in the last two years. The American System of Dentistry is probably the most extensive and the most expensive work of the kind; but I think even that is not beyond the limit of men of ordinary income. The progressive dentist cannot afford to be without the literature of his profession any more that he can afford to be without instruments and materials.

Dr. A. W. Freeman. I have the greater number of those books myself, and I hope to have a few more. I agree with him in regard to the benefit and necessity of their possession. Yet, notwithstanding, I think scarcely one-half of the members of our profession will be able to have them

Dr. Gilmer. Mr. President, as a junior member of the committee I arise simply to ask a question for the purpose of gaining information, not to combat anything that has been said, since I agree with the most of it. There is a committee on "dental science and literature." Are these words to be regarded as synonymous, or do they imply more? Do they imply that we are simply reviewers of books? Reviewing it seems to me is a part of our work, but only a part. The question is asked that the committee may know what is expected of it by the society.

Dr. Ames. Mr. President: It strikes me that a great deal of this trouble has arisen from the naming of the committee. This is a committee on Dental Science and Literature. Now, if the committee's report is to cover the entire field of dental science, I can see no use for the various papers which are to come. I think the difficulty comes from the words "dental science." If we had a committee to report on Dental Literature and a committee to report on Dental Art and Inventions, we would be rid of a great deal of this trouble. That I think is a solution of Dr. Gilmer's question.

Dr. Patrick. Mr. President: It seems to me that we are making some progress. The remarks I have heard are excellent.

It would appear that the purpose of this committee is to examine all publications that are supposed to be engaged in the advancement of the science of dentistry; and where they find palpable errors promulgated, it should be their duty to denounce them here, and let the publishers know that the members of this society cannot be fed on *chaff*. Now we have a great many dental journals; and I suppose they may all be classed as dental literature, in a sense. I know very well that there are very few journals—I was going to say none, but that is not quite true—there are very few that will refuse the publication of an article, however long, however short, or however erroneous, if the man who writes it is a patron of the house that issues the journal. (Applause and laughter.) I take nearly every dental journal, and I give you my word, on the honor of a gentleman, that I can go through the whole in about an hour. I am so used to it, it is like editing a daily newspaper with shears and paste-pot; by merely glancing at an article I can tell what is and what is not worth the labor of cutting out. The matter printed is nearly all a rehash. By looking at one journal, as a rule you get nearly what you find in another—one-third or two-thirds of it the reports of societies and such matters. And the editors of the papers are not to blame. The profession are to blame. The dental societies all over the country allow the parties interested in these journals to do a great deal of work that is worth money, and do it for nothing. It is disgraceful and it ought not to be done. Of course we pay for it in the long run. If a man sends me a journal free, I know what it means, the editor on proprietor expects to obtain an equivalent.

DR. CUSHING. Before this subject is passed I wish to say one word in answer to Dr. Gilmer and Dr. Ames. It is very much the same as I said before, only I will try to say it in a different way, so the members of the committee can understand what I mean and what I think the originators of this committee meant. I will read this again: "Whose duty it shall be to report annually, on the first day of the annual meeting, on the progress of science and literature as appertaining to dentistry." That entails a great deal of work on the committee, but it does not necessitate any lengthy report here, except perhaps on the subject of literature. They might give us in three pages probably all that had been accomplished in the line

of progress in the science of dentistry, during the year, the salient points of which they should call our attention to. That is the purpose of this committee; not that they shall make an elaborate report, detailing every method of investigation of everything done during the year; but that they give us the result of what they have found as having taken place during the year. And so with regard to the literature; not strictly a review, but that they shall tell this society what is desirable and valuable for its members to read, of the new publications. I think Dr. Noyes will agree with me that that was what was intended when this committee was created. As Dr. Patrick has just remarked, we are making progress, and I am very glad of it. I think we shall "get there" by and by, when we shall get this committee waked up.

Dr. Ottofy. I willingly accept all the criticisms that have been made, and am glad they have been made concerning the section which the chairman assigned to me. I have written the part on dental literature, Dr. Hanaford on dental practice and Dr. Gilmer on dental science. It was the effort to keep from making the repetitions so severely condemned in discussion, that I as secretary of the section on dental literature in the American Dental Association was obliged to bring in a different kind of a report here; otherwise I should have read to you a paper which I would be obliged to read again at Louisville. Our societies range from local to national and international. There are matters proper to bring before this society that would be entirely out of place before a national association, and there are matters that more properly belong to the national association. I have on my desk at home a report of everything relating to dental literature that has occurred since last August, and at the meeting last August I made a similar report concerning everything of interest occurring during the previous year. I think it more important that a report of that character should go before the national association than before an association of this kind. At this place it was proper to recommend the making of contributions to dental journals, and the reading of dental journals; but at higher associations, whose proceedings are published in the journals, is the place to report what has been done throughout the world. As to the report on dental science, as soon as I read that part of the paper I saw that it would conflict with the

paper on Operative Dentistry which I am to read; and there were other parts which would conflict with other papers to be read. Perhaps the best thing would be to strike out "Dental Science" from the title of the committee and leave it as a committee on literature only.

REPORT OF THE COMMITTEE ON DENTAL ART AND INVENTIONS.

W. T. MAGILL, Chairman.

Your Committee offer the following Report:

First, regarding things presented at our last annual meeting which we have had opportunity to test practically.

The Knapp Blowpipe stands in the laboratory as the peer of the dental engine in the operating room. It is all that can be desired for the object intended.

The Medical Syringe, with recent improvements, invented by Dr. Dunn, meets a long-felt want in the treatment of various conditions, not only of the mouth but other parts of the body. No dental case should be without it.

Dr. J. H. Woolley's Root Canal Dryer. While we have other means of gaining the same results, this instrument is simple and practical; the platinum branches being preferable in the opinion of your committee.

Gold Lined Rubber Plates. We have made a thorough trial of this process, and find much therein to recommend. So far as the union is concerned between the metal and the base it performs all that is promised. The sulphur in the rubber unites with the silver lined gold so perfectly that they can be separated only by persistent cutting and scraping. It is essential, however, that the silver surface be made very clean.

The Sandpaper Disk Director of Dr. Matteson is a simple and practically useful appliance, and the same may be said of Dr. O. Carpenter's clamp for holding the rubber above labio-cervical cavities in bicuspid teeth.

Dr. James Bradley's Adjustable Matrix is easy of application and useful. Give it a place.

Dr. Swazey's Clamp, as improved, for application in the interspaces of the teeth does very nicely in cases where it is indicated.

Regulating Appliances, presented by Dr. W. N. Morrison. Of these the jackscrew is the motive power. The movement is positive, the principle correct. As with all appliances, each case treated will demand study, but correctly applied these will accomplish the work with comparative certainty.

The Band Matrix of Dr. John H. Reed, for practical simplicity as a universal matrix, fills its mission.

Of the Rubber Dam Holder, procured from Messrs. Ash & Son, by Dr. Gardiner; the Gas Time Regulator for the vulcanizer, invention of Dr. Taggart; the Shaw Dental Engine; Dr. Saloman's incandescent lamp; Dr. Tibbitts' Bracket Table; Dr. McKellop's new Dental Register, we cannot speak from practical experience, but they all need only to be seen to be appreciated.

Second, appliances brought to our notice during the past year, some of which we have been able to test. In some cases we have not been able to obtain them by reason of the apathy of the inventors or producers, or because they were being held back for further improvement.

Colson's Plugger.—A new engine mallet, by Dr. E. E. Cady, diminutive size, and stroke similar to that of the electric mallet.

New method of packing amalgam with Japanese bibulous paper, suggested by Dr. Bonwill. Whoever will try this method until familiar with its advantages will not be likely to abandon it.

A rubber dam clamp, promising certain advantages, is one with a double hook or ears to prevent crowding down on gum. See p. 665 Independent Practitioner, 1887.

Also improved labial and buccal clamp, by Dr. Daniel B. Freeman, Chicago.

Dr. Newkirk recommends Klump's screw clamp port-polisher for carrying wood polishing points in this way: the cap is discarded and the points pinched together so as to grasp the point firmly. The end of the wood shank should be cut off to allow the wheel or point to come close to the clamp.

Pyle's pearline has been recommended for cleansing vulcanite flasks, spittoons and the hands after laboratory work. Try it.

SUPPLEMENTARY REPORT.

In addition to what has been reported we wish to bring to your notice a Matrix presented by Dr. D. B. Freeman, made of "Tagger's Tin," which we think would be valuable in the restoration of badly decayed or broken central and lateral incisors.

Presented by Dr. G. A. Bowman, of St. Louis, a nest of rubber cups, made by dividing a common rubber ball in the center, for holding small quantities of pastes, plaster and polishing materials of all kinds for use at the chair or work-table. They are not liable to upset, are easily cleaned, and always ready.

Also by the same, an impression cup. This revolves upon a rivet, enabling one to take an impression of two or more teeth, situated anywhere in the arches; particularly adapted to crown and bridge work cases. Also an appliance for holding a sponge upon a currundum wheel, keeping it constantly wet. All of these articles presented by Dr. B. are well adapted to the uses intended and of rare simplicity.

Dr. W. N. Morrison, of St. Louis, presents a soft rubber polishing wheel, with hard rubber center. This wheel can be used on cone screw mandril, without a headed screw. They are, we think, superior to any now on the market, and we hope they will be manufactured in sufficient quantities to supply the profession.

S. H. Coale, of Chicago, presents the "Belding Motor." The claims are that it is noiseless, the lightest, simplest, cheapest and most perfect motor in the world. Speed governed by slight foot power leaves the hands entirely free. No care of the battery is required oftener than once in two or three months, and then for but a few moments, It reverses direction in the simplest manner when required. We have not had the opportunity of testing this motor, but it has the appearance of accomplishing all that is claimed for it.

Also the Detroit Motor, presented by the Detroit Motor Co. of Detroit. This has been noticed before and is used by many dentists. They make and display several larger sizes for use with direct currents of any electric light for power on lathes, fan or en-

gine. A. 1, a dental motor run by a battery, is designed especially for dentists, and affords all the power required in operative dentistry. All the information we have been able to gain from those using it, as well as from other sources, has been favorable.

H. A. Parsons presents a warm air apparatus, and saliva ejector, which seem to possess merit. The drier consists of a platinum tube insulated by non-conductors, and heated by an electrical current. The battery is composed of two cells having a carbon surface of 300 inches and a range of heat from 95 to 150 degrees Far. 95 to 100 degrees Far. is quite sufficient for drying cavities and obtunding sensitive dentine. For drying root canals the heat is intensified by merely immersing the elements a trifle lower in the fluid. The Saliva Ejector consists of a pump arranged so as to be attached to any engine, water or electrical motor power. The pump by exhausting the air from the bottle creates a vacuum, and when this is formed draws with sufficent force to empty the mouth of the thickest saliva.

Case for holding instruments used with the Dental Engine, &c., by Dr. A. H. Fuller, of St. Louis, Mo. First row of grooves is for burrs that are carried in stock, and those that have been laid aside to be re-cut. The holes to carry those used every day in practice, are arranged according to size from left to right, and from top to bottom according to shape. There is a special place for each instrument which is in sight and readily accessible to the operator. The case is easily closed, keeping instruments free from dust.

Aluminum Cast Dentures, presented by Dr. C. C. Carroll, Meadville, Pa., a new and successful method of casting crowns, bridges and dental plates, with his prepared Chemically Pure Aluminum Base. This apparently combines stiffness, conductivity, lightness, strength and durability, with perfect adaptation to the mouth and comfort to the wearer. The claim for this base is that it is non-oxidizable, free from any action of the secretions, compatible with the tissues, and that mouths congested and inflamed by vegetable bases, make a speedy and permanent recovery under the aluminum plates. They are highly spoken of by such men as Drs. W. H. Eames, O. A. Hunt and S. B. Palmer, whom your committee think good authority on this subject. This base appears to

occupy intermediate ground, taking the place of gold and continuous gum where expense comes in question, and enabling the ordinarily skillful dentist to do away almost entirely with those miserable substitutes, rubber, celluloid, etc. Dr. Palmer says "Those who have no practical experience cannot appreciate the superiority of Aluminum for dental plates."

Last but not least, is an appliance presented by Dr. W. H. Taggart, of Freeport, Ill., a corundum disc molder. That part holding the mould or form, resembles somewhat a pair of large sized pliers, together with a number of moulds or forms, so made and arranged as to be quickly and easily placed in position, and as easily removed. The material is placed in the form in small pieces and that part of the instrument holding the mould is placed over a Bunsen burner and heated slowly until the requisite temperature is reached, when force is exerted on handles, completely closing the mould, and also holding the mandrel upon which the disc is to be moulded. When cold, open and you have a disc, wheel or point according to the mould used, that is absolutely perfect. These moulds are made in every form needed by the operator, and better adapted to his wants than any thing in this line your committee has ever seen. For perfection and extreme simplicity, your committee take great pleasure in bringing it before the profession, no member of which should be without it.

W. T. Magill,
E. S. Talbot,
J. Frank Marriner. } *Committee.*

DENTAL MORPHOLOGY AND THE ETIOLOGY OF IRREGULARITIES.

BY DR. JNO. J. R. PATRICK.

In the development of the different parts of the body which successively come into existence, all those morphological and physiological changes are identical with those which commenced the life history of the animal. There is no fact better settled in science than the origin of all organized beings from simple cells, but in order to be productive these simple cells must be fertilized by meeting and blending with dissimilar cells. In other words, a paternal and maternal cell must coalesce—the pollen and the ovule in plants, the egg-cell and the sperm-cell in animals.

Now the egg-cell unfertilized is entirely different from the same cell after fertilization, for while both sperm and egg cells must be regarded as true cells, nevertheless after amalgamation takes place the result is an entirely new organism, produced by the united activities of maternal and paternal cells, and the result of the combination is a true parent cell, which soon becomes a germ, the germ an embryo, the embryo a fœtus, the fœtus a child, and the child an adult, destined when surrounded by the requisite conditions to give rise to or fertilize another cell like that with which this cycle of changes began; and it is thus that the cell continues to live beyond, as it also pre-existed the life of the individual organism.

Now, it is agreed by all good recent observations that the individual evolution of man and all other animals, begins with the formation of the parent cell, that is, a nucleus formed in the center of the ovium by a union of the maternal cell with the paternal cell; a nucleus of complex nature, of diverse origin, from two equivalent and complementary parts. The next step in the process of

development is that known as segmentation of the vitellus or the granular protoplasm of the ovium. Each segmentation becomes a nucleated sphere of epiblastic and hypoblastic cellular membrane. Each sphere again subdivides, and the same process is repeated with each subdivision, until the cells divided from the epiblastic sphere divide more rapidly and becoming smaller ultimately surround and inclose the hypoblastic cells. Up to this point of development we have two cellular membranes—an epiblast and a hypoblast—the epiblast surrounding the whole ovum within the vitelline membrane, and the hypoblast underlying a considerable portion of the epiblast.

The cellular membrane that invests the whole ovum is called the blastoderm, and the whole structure is called the blastodermic vesicle. The process of division is still continued, for in that portion where the two parts coexist, a third membrane soon makes its appearance (Fig. 1). This membrane is called the mesoblast, as its

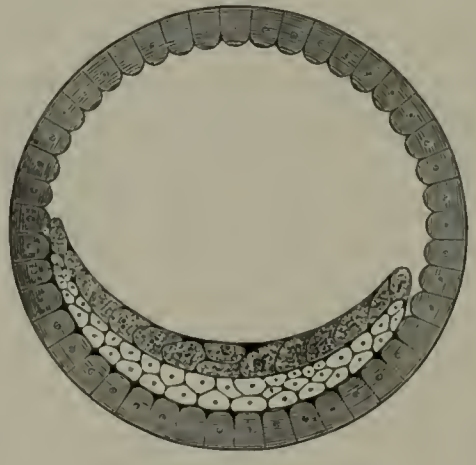


Fig. 1.

Blastodermic vesicle at that stage of development where the mesoblast first makes its appearance.

relative position indicates. This membrane is supposed to be derived from the hypoblast by the subdivision of its cells. These three cellular membranes form the germ area, or gastrodisc, and it is here that the embryo first makes its appearance.

Now it is conceded by all morphologists that the epiblast gives rise to all the epidermas of the body, the epithelial lining of the cerebro-spinal canal, and all its derivatives; the ventricles of the

brain, the cerebro-spinal nervous centres, and the various parts of the organs of special sense. The hypoblast is the source of the epithelium of the alimentary canal and all the organs developed as diverticula from it. From the mesoblast the remaining parts of the body are derived, including muscles, bones, connective tissues, blood vessels, the generative and urinary organs, the dermis, the mucous membrane of the alimentary canal, and of the organs connected therewith. Now, in order to produce this great diversity of parts, the blastoderm thickens in various regions; folds and juts arise in the different layers, and form pouches, sacks, tubes, and processes, and the mesoblast especially splits into distinct strata, at the same time the cells composing the layers alter their character as they multiply, and instead of being very much alike, become more and more unlike and specialized for the functions they have to perform. Thus the heart, liver, spleen, lungs, renes, brain and teeth are evolved from cells contained within the original parent cell. Now each one of these organs commences its formation in the same manner as the parent cell, by a system of segmentation and reproduction of its most intimate parts.

It is difficult to understand how a tooth, which is composed of bone tissue, should be endowed with the *three* organs of construction—the epiblast, hypoblast and mesoblast, when the mesoblast alone, according to the best morphological authority, contains all the organs of construction necessary for the production of a tooth: muscles, bones, connective tissue, blood vessels, dermis, mucous membrane, alimentary canal, and all the organs connected therewith. Certainly a cellular membrane with so much constructive ability at command could very well proceed with the production of a tooth without the interference of the epiblast and hypoblast.

There is one thing, however, we can rely on without a doubt, that the Blastoderm is a nest of eggs that are exceedingly difficult to count without attempting the still more difficult task of nominating the product of each egg before they are hatched: Were it not for an intimate knowledge of the anatomy of a mature animal, what we now know of its early evolution would be a mere abstraction, an ideal construction, not a real transcription; for had the parts to be examined not been first known to be the embryo of a certain organism we never could recognize the future organism

in the embryo. The most important fact revealed by the science of morphology is that the fertilized cell is entirely different from either the maternal cell or the paternal cell; because it is in the most real sense both the male ancestor and female ancestor, of all the numerous generations of cells which are afterwards employed in the formation and building up of the many celled organism; and this important truth is verified by all observers—that the child inherits many qualities physical and mental from both parents. Do we not see the paternal large teeth reproduced in the daughter's small mouth? and the maternal small teeth in the son's larger jaws? and frequently the daughter's teeth are irregular for want of room while the son's teeth have more room than is necessary. That heredity originates in an actual amalgamation or coalescence of the two primitive cells cannot be questioned, but many points in regard to the development of the teeth are still obscure. I will, therefore, leave the primordial tooth for others to discuss until they settle the many differences of opinion founded upon observation, and commence at that stage of its devlopment where the microscopist usually leaves off, and take up the inquiry at that stage of development known as the saccular.

If we take the head of a young hog between the ages of eight and ten months, we will find the homologue of the child's six year molar fully developed and by removing the lower jaw, the zygoma and malar process we will expose to view an elongated puffy ridge extending from the first permanent molar backwards and upwards with a bulbous termination; which termination in the course of time becomes a tuberosity. By removing the outer thin plate of the puffy ridge, the two cells containing the two last permanent molars will be exposed to view in their saccular stage of development, the (Fig. 2) anterior one more advanced than the posterior one, the cusps of the enamel of the anterior tooth being united, whereas in the posterior foetal tooth the cusps are seperate. Now it will be observed that the sac enveloping each future tooth is connected with the gum by a funicle which is merely an elongation of the sac: it is an umbilicus, and the sac is a placenta. The connection with the parent stock presents the same phenomena that all organisms do that are connected with and dependent for their development and nourishment on a parent. Now, as the future tooth progresses in

its development, the funicle or umbilicus enlarges near the cusps of the enamel, becomes detached from the gum and gradually

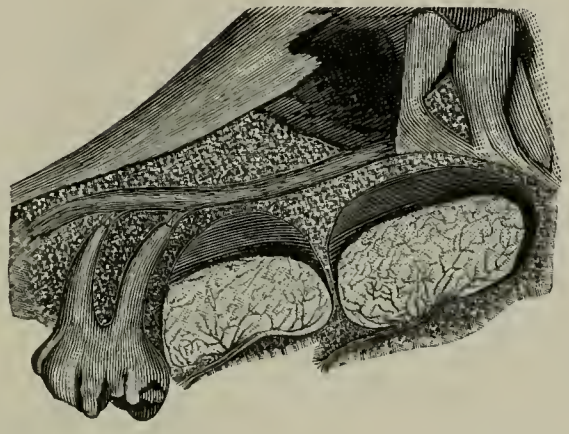


Fig. 2.

From hog eight months old; external thin plate of bone cell removed, exposing the two last molar teeth in their sacs and their connection with the gum by the funicles.

contracts upon the sac, at the same time, and with equal pace nutrient vessels from the growing surrounding thin bone, emerge from the cell wall of the alveolus, make connection with the sac, and thus a mutual interchange of circulation is accomplished. The enamel of the tooth being completed, the internal and external walls or plates of the alveoli gradually part, allowing the enamel crown to emerge. There is always an orifice behind a fully developed tooth when another one is to appear behind it, and this orifice is the initial point of cleavage, of the external and internal plates of the alveoli. As the enameled crown emerges from the alveoli the sac slips back gradually to the neck of the forming tooth and there remains, and the cementum, which sometime previously had commenced to form at the neck, continues to grow in the form of hollow cylinders (Fig. 3, B) inclosing the granular protoplasm that eventually is productive of dentine. As the root or roots of the tooth approach completion, the sac becomes slightly concave at the apex of each root and is there perforated by nutrient vessels. (Fig. 3, A). During all this process of root formation the sac adheres closely to the root or roots; in other words, the sac is the formation membrane of the enamel and cementum, the inner lining of this sac (in the opinion of no less authority than Professor Huxley) is

the membrane first discovered and described by Mr. Nasmyth, so that in a morphological point of view the relations of the cement with the enamel show them to be homologous. Thus it appears that the line of succession in the formation of the hard tissues of a tooth is enamel, cementum and dentine. Now, when a tooth is first forming within its capsule or sac, it is globular in form, and the surrounding bone tissue is a mere thin cell devoid of the cancellated bone that afterwards appears, but as the root develops this

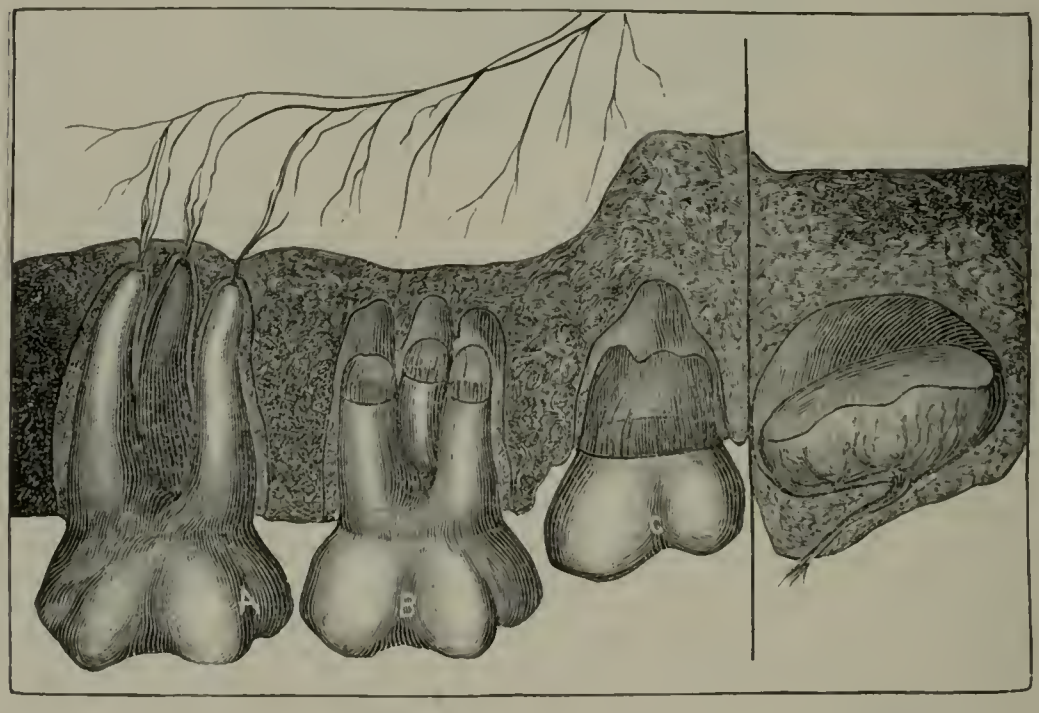


Fig. 3, Fig. 4,

Fig. 3, A.—First superior permanent molar at eight years, showing the conventional connection of the posterior dental branches of nerves with its roots.

Fig. 3, B.—Second superior permanent molar at fourteen years, the cylindrical roots, and the root cells partly formed; there being no apical foramina at this stage of development, the posterior branches of the dental nerves have no connection.—*From dissection.*

Fig. 3, C.—Dens Sapientiae at nine years old, the connate roots forming.—*From dissection.*

Fig. 4.—Second superior permanent molar at four years old in a saccular condition, the enamel cusps formed but not united.—*From dissection.*

thin shell of bone thickens and grows with equal pace, following the form of the tooth roots, including the neck, filling in the bifurcations of the roots with cancellated bone, and giving to each root

a separate cell. If we consult Professor Flower's Diagrams of the nerves we will there find depicted the superior maxillary division of the fifth, in which the posterior and anterior dental branches throw off filaments direct to each particular root of each tooth. This is in the main correct so far as the posterior and anterior main branches are concerned, but the branchlets of these branches making direct connection with the roots of the teeth cannot be shown by dissection; and while I recognize this portion of the diagram to be in the main correct, and impossible to show the connection on paper in any other manner to be intelligible to the student, I also know that there is such a thing as *conventional anatomy.* The teeth of the inferior maxillary receive their supply more directly from the inferior dental nerve, and this is owing rather to restriction of territory than necessity, and the same reason holds good as to the development of supernumerary teeth. In the inferior maxillary they seldom or never appear, as there is little room in this region to accommodate such extravagance. On the contrary the superior maxillary furnishes the largest number of examples of superdentition, not always anomalous in form, and rarely make connection with the superior dental nerve or vessels, but obtain their supply from the surrounding tissues wherever they may be located; they are frequently confused with the regular teeth, producing a monstrosity; sometimes they are fused to the roots of a well-formed tooth, in such examples the supernumerary is usually prone. They are sometimes found imbedded in the palate process with the crown directed towards the alveolar process. How can such teeth form direct connection with the superior dental nerve? Yet such teeth have obtained from their surroundings nutriment sufficient to develop enamel, cementum and dentine. If further evidence were needed to establish the fact that a tooth germ can develop its several parts independent of special nerves and arteries assigned to them by the general anatomist, the deciduous teeth are examples, for these organs are supplied by deciduous vessels, surrounded by deciduous bone and are exuviated in the course of time as useless material. In teeth, as in other organs of the body, we frequently have instances of imperfection; in the progressive development of the structure concerned, the formative process not being sufficiently vigorous to carry on the work to completion, is arrested at some point, and leaves evidence of the

forms which the part naturally presents in its transition to the mature condition—evidences from which we may derive much useful information as to the series of changes by which the perfect form is evolved. Fig. 5 is an instance in point, in which an inferior right second permanent human molar passed very little beyond the saccular stage, forming enamel and cementum, but little or no dentine. The tooth caused no pain although very much decayed, was loose and troublesome, larger than the adjoining teeth, and much below them, so there was no occlusion with the corresponding tooth above. The tooth is a hollow spherical body, made up of cementum and enamel.

Now it is evident, had this tooth not emerged from the gum but remained in its cell with the alveoli, with its connection sev-

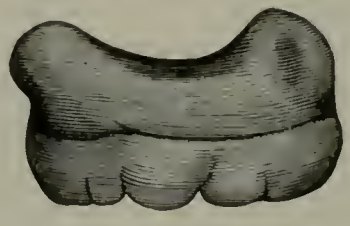


Fig. 5.

Abnormal superior right second molar, arrested development.

ered from the gum, and having no other source of supply but the nutrient vessels from the cell wall to the sac—which would be sufficient to build up its cementum—and not receiving a supply of nutrient vessels to its granular mass of protoplasm, it would fail to produce dentine, and the undeveloped protoplasm would degenerate, and in all probability produce a dentigerous cist, or, if not so well pronounced locally, it might produce symptoms of a constitutional character.

It will be observed that I have selected the developing permanent molars of young mammals for investigation, partly from convenience, but more especially because I find that from these being later in development than the front ones, I obtain superior advantages for investigation, the parts being better defined and less fragile, and, as a consequence easier of dissection than the front teeth of a fœtus, and, finally, I have endeavored to fill a space that

I think has been left open between the general anatomist and the microscopist.

DISCUSSION

OPENED BY DR. BLACK.

Dr. Black. Mr. President: I must confess that I am a little puzzled to know how to open this discussion. I am sorry Dr. Angle is not here, as he probably would have thought it over, and had the paper of Dr. Patrick longer, and been better prepared to open the discussion on so intricate a subject as this. Dr. Patrick handed me his paper about twelve o'clock, and I have looked it over somewhat carefully. Now, I shall find it necessary, probably to disagree somewhat with Dr. Patrick. For it seems that we have not looked at this matter precisely from the same standpoint; and this will often account for differences of views. The same landscape may look very differently from different or opposite directions.

The general description of the ovum and its development is, as he says, according to the books, and I think the books are perhaps about right; because the best of these books, or the originals—for many books are made from these originals by men who never saw the thing itself—the originals are generally very close to correctness in the matter of the development of the ovum. So that the formation of these membranes or the segmentation—the formation of the epiblast, the hypoblast and the mesoblast, are certainly demonstrable. But we are not altogether certain yet as to some of the organs formed from these membranes. It is not very certain that the kidneys and the urinary organs are formed from the mesoblast; while the glands proper are none of them formed, unless it be the kidneys, from the mesoblast.

But the general description of the changes in cell forms, and in some functions given by Dr. Patrick, is certainly correct.

Now a word just here as to what the doctor has said in regard to those nerves. I wish to bear him out in the statement that the tooth will be developed without a connection with the nervous system. For we find some particular malformations in that enclosure which he speaks of at the back of the fœtus, in which the mesoblast turns over and forms an elongated sac along the back, and in which nervous system is developed. Sometimes the closing of that sac fails, and we have what is known as spina-bifida; and in these cases we have an imperfect development of the nervous system. Such children usually die on account of this. Sometimes we find that open from end to end, and no nervous system is developed; and yet, as I know from my own observation, the child may be developed to term, very nearly perfectly and not a nerve be found in it. And I have examined the teeth under those conditions; that is, developed to the term,—well developed, and they are nerveless. And I have no doubt that in an embryo of an animal in which the teeth are developed completely before birth, if there is such an animal, the teeth would be completely developed without nerves. It is possible that some teeth may be developed, without finding a nerve branch, but I think it, in the ordinary course of events, very improbable indeed. We generally find that the teeth are sensitive.

My friend has taken a very peculiar view of this subject, one which surprised me somewhat; but at the same time I must say that microscopic appearances in the dissection of specimens, particularly those that have been preserved in alcohol, present very much such views as he has given us. Now, taking this view here, for instance, (referring to one of the charts) in examining this macroscopically, you will not find this umbilicus so pronounced as you see it here; but you will be able to find it without the help of a magnifier, if you work carefully and closely. It is what microscopists call the epithelial cord, and is a solid mass of epithelium. I have never seen any vessels within this cord. But after a time it breaks up, and we do find vessels in that neighborhood. Now, that opening through the bone that has been spoken of, the hole behind the temporary tooth or child's tooth, in which

the permanent tooth is developed, we find with great regularity, and it is easily found microscopically. These tissues peel off very readily, as has been said, giving the appearance to the eye of a simple sac, disconnected with the surrounding tissues. The tooth and the whole thing comes out. I will have to have a blackboard in order to illustrate the difference. (Blackboard produced.) You will see here (referring to one of Dr. Patrick's charts,) this illustration of the epithelial chord, or the umbilicus, or whatever you may choose to call it, runs out here to the surface of the gum tissue. The epithelium which should cover this is not shown here, but it connects with it; and if the epithelium is stripped off by maceration in alcohol or in some other fluids—in fact almost any of them, if it is macerated very long—there will be left a fragmentary end opening out to the surface of the mucous membrane as shown here (referring to chart.) And the chord is a solid chord of epithelium until the process of absorption disposes of it. I will talk about that presently if you will not let me forget it.

Now, this is shown to be a hollow cavity, and when you pull the tooth out you will find it, if you have shrunken your tissues by immersion in alcohol. The membranes will pull the one from the other, and we will have a sac that we can pick out out with our fingers, in fact we may from the fresh specimen very readily. But when we come to cut the section and examine it critically, we find certain connections of the tissue with other tissues. (Drawing a diagram on the blackboard.) This sac has been originally formed by the ingrowing epithelium. (Illustrating.) This is the surface of the mucous membrane. Here is the epithelium. It dips down here, a solid chord. Here is the connective tissue—no bones in the way at this time. It is fœtal tissue, very imperfectly developed. This dips down in a little tongue, running all around the jaw. It is an undivided band that runs all around; a little tongue dipping into the mucous membrane, and here is the chord given off, a little body of epithelium: that grows and it begins to enlarge at the end, forming a bulb, and grows larger as it goes down. That is made up of epithelial cells simply. Now, as that grows larger it develops into this form (illustrating), and at the same time this sac is being formed, a thickening and development

of the connective tissue takes place about it, forming the dentine papilla; but this chord and bulb are epithelial. And then we have a peculiar formation of these cells of the bulb, so that in the central part they finally assume a stellate form, known as the enamel organ. This is derived from the epithelium; not from the mesoblast, but from the epiblast. The tracing is direct from the one to the other, and at the same time the part here (referring to inner margin of the bulb in the drawing) is being thickened and forming elongated cells, the ameloblasts. After the formation of this sac-like condition we have a thickening in here (referring to the dental papilla in the drawing) as well. But we find that this sac-like form connects with that. Now, if at this stage we shrink that tissue down, you will pull this off here (indicating the place in the drawing) pulling out your enamel organ and forming crown, and leaving the dentine organ in place. Here we have the dentine organ from the mesoblast, the other from the epiblast; not the tooth entirely from one tissue. It is not formed in that way. We have the skin of the tooth, the enamel; we have the body of the tooth, connective tissue, from the mesoblast, and we find the nerve connection to be with this (referring to drawing) and the vascular connection to be with that (referring to drawing) and after awhile this and that forms the enamel. That is, the enamel is formed between the dentine germ; and generally the dentine has begun to form before there is any cementum. But the cementum does lap on to the enamel as has been stated, and sometimes we will find little sheets of cementum grown all over the enamel. With the development of the tooth this enamel organ disappears. Perhaps that is a good enough word. I need not say it is "absorbed." It disappears.

We will find that epithelium broken up and distributed all about in little groups along this line (indicating the place on the drawing), as it disappears, first forming little pearls of epithelium that stand out clear and distinct in microscopic sections of this tissue. As we go on from the younger to the older they disappear entirely. They are absorbed.

Now this matter of absorption is not a supposition. We may trace it in bone, we may trace it in connective tissue, we may trace it in epithelium that has gone below the surface, and particularly

in the hard structures, the bones and teeth, may we trace it with the greatest ease and certainty, and know that this or that part is being removed, by the process of solution, by being dissolved; by certain cells that grow along against it and furnish some material which causes it to dissolve and disappear. That is the way the roots of temporary teeth get away; that is the way roots of implanted and transplanted teeth get away—by absorption.

These primary membranes about the tooth get away in the same fashion precisely. And as this tooth comes up to take its place in the arch, as was so beautifully described by Dr. Patrick, by that opening. The opening does occur but it is not by pushing the bones asunder by any force or the moving of them, other than the absorption on the one side and the building on the other. That is the way it is done, and we may trace it just as certainly as we may trace our own footsteps in the snow. But it will require a good deal of practice before we do this successfully. I cannot explain all that here. These membranes, as I have said before, are absorbed. The bones about it cover it up, sometimes very completely, sometimes not. But the permanent teeth are often covered entirely with bone. This will be absorbed in advance of the tooth; a regular process performed by organs brought into existence for that purpose; and instead of this becoming the peridental membrane of the tooth, this Nasmyth's membrane, it disappears.

It is wonderful the amount of trouble that man has given us with his membrane. We used to think when a membrane was once formed it had to stay there; that it had to do something else when its function was gone. That was the opinion of physiologists and anatomists years ago. Well, now we have found that is not true; that when nature gets through with a thing she throws it away, absorbs it just as she does a frog's tail. It grows less and less until it disappears, or drops off on the outside. The new thing to be done is done by new tissue. That is the general law of physiology. So in this case the new thing to be done is done by the new tissue. The pericementum is not simply a remnant of this sac, but it is a new creation, a new growth.

What would be Nasmyth's membrane if it came down, continued on the root of the tooth and formed the cementum? The cementoblasts necessarily, something entirely different from the cells of this membrane, different in every particular. And these cementoblasts form the cementum, and we get this connection here with the tissues (referring to Dr. Patrick's chart), where these nerves are shown as entering the tooth.

(Referring to another part of the chart.) Now I want to say a word about this curtain. As the crown is developed the enamel organ grows thinner and thinner and drops down upon the cusps of the teeth, as has been shown by Dr. Sudduth. Its outer layer of epithelium disappears and the blood vessels enter in close to the enamel as it approaches completion. As the enamel is completed we have that portion of the enamel organ still remaining, which seems to be absorbed from the cusps of the teeth and gradually disappears as the tooth emerges. Not only this, but it will disappear entirely from impacted teeth, leaving the enamel coming in direct contact with the connective tissue, and here is where we get irritation in the eruption of belated teeth. That is where we get the irritation in cases of impacted teeth, that is where we get cysts and so on, the enamel coming directly against connective tissue, —abnormal apposition of tissues.

Now I want to say a word about this tooth (referring to Fig. 5, of Dr. Patrick's chart, the tooth with undeveloped root.) I do not know whether the doctor has cut that through and made microscopical sections and examined them and found nothing but cementum and enamel. I have cut through a good many such specimens and I have found dentine in every one, more or less of it. Perhaps in these badly malformed teeth there will be no outward appearance of dentine whatever. You could not tell that there was any there. There are none of the usual forms of the tooth root. Sometimes there are none of the usual forms of the crown, nor of the enamel, but if we cut them through we will generally find that there has been a considerable amount of dentine formed.

In regard to the function of membranes. A membrane that has a function, as the mucous membrane, the synovial membrane, and so on, is constituted as the support to certain function-

ing cells. That is the general rule. The mucous membrane is not a mucous membrane except by virtue of the cells supported by that membrane which perform a function, as the epithelium, the pseudo-epithelium in the synovial membranes, &c. A capillary is a capillary by virtue of the pseudo-epithelium * of that capillary vessel, which throws out oxygen to the tissues in the general circulation, and takes oxygen into the blood in the lungs, the tissue, apparently the same, the epithelium apparently the same, but having different functions. And it is the functions of these epithelia that constitute the character of their membranes. So it is the function of the cementoblast to build the cementum.

In regard to supernumerary teeth, I will simply say that I have met with some in the lower jaw, but they are comparatively rare. Most of the supernumerary teeth I have seen were in the upper jaw, and they have been very erratic as to their positions. I am sorry that sometimes dentists extract the normal tooth instead of the abnormal one, as I saw in a case a few days ago. But this, I am persuaded, is becoming somewhat rare. Occasionally it is difficult to tell just what should be done with these super numerary teeth, as for example, a case where a young lady had five lower incisors, and I do not think anyone could have told which was the supernumerary. But there was one too many. They were alike and I left them all. They were in nice allignment and all that. At one time I saw four molars on either side in the lower jaw instead of three. I have, perhaps, said enough to introduce this subject. In fact I have talked a good deal longer than I intended.

Dr. Carroll. I would like to ask Dr. Black, as a histologist, if he regards these supernumeraries which he finds in the upper and lower maxillary as abnormalities and accidents, or as a possible effort at a return toward the prehistoric man? That is, in the direction that man at one time, instead of having thirty-two teeth, had thirty-six, possibly?

Dr. Black. I will say, in answer to that question that I regard these supernumerary teeth as mere vagaries. We find mis-

---

* Pseudo-epithelium, so called because supposed to be derived from the meso-blast, or middle layer, and thus distinguished from the "thelia" of the epiblast and hypoblast.

takes occurring continually in nature, monstrosities of various kinds, and they are mere vagaries. That is my notion of it. They probably result from some diverticulum from the tooth-producing area. It is nothing uncommon in following out these epithelial chords to find, for instance, a chord passing down here (referring to chart), and a little diverticulum going off, and a chord starting off in that direction again. Sometimes there will be two or three of these on a single chord, and I suppose supernumerary teeth are developed from some of these little diverticulæ, as was the opinion of Dr. Dean, whom many of you must remember. He first gave expression to that idea, and I am inclined to think it is correct. There is scarcely any possibility of proving it. The running over of foetal jaws for the purpose of discovering diverticulæ that are in process of forming supernumerary teeth is almost out of the question. True, somebody *might* accidentally run upon such a case, but it is simply a theory that seems probable. Sometimes we get a very perfect tooth formed probably in that way. It may be an incisor, it may be a cuspid or a molar. As I say, I have seen supernumerary molars in the lower jaw, four on either side, perfect in form, but two of them must have been supernumerary. I do not think it is a return to any previous type at all when these teeth occur.

Dr. C. R. Taylor. I would like to ask Dr. Black what, in his opinion, is the reason that malformations and supernumerary teeth almost always occur in the second dentition, and seldom, if ever, in the first dentition?

Dr. Black. Well, they do occur much more frequently in the second dentition than in first, yet I have seen, only a short time ago, an extra lateral incisor in a child's mouth; a little girl about four years old; and I determined, from a thorough test that that extra lateral incisor was united to the normal lateral incisor by its root. The crowns were entirely distinct. And I have seen quite a number of supernumerary teeth in children. But such cases are certainly comparatively rare.

Dr. Taylor. There was another question, I did not understand, either from Dr. Patrick or yourself, though you both referred to it. Will the teeth be perfect in their form where there is no direct nerve connection?

Dr. Black. I believe they may. But I have never seen a case in which the formation was complete. I have seen the formation of the crypts complete up to the time of birth, where I could find no nerves whatever; not only no nerves in the teeth, but none in the foetus, anywhere. It is true the foetus was somewhat malformed. The jaws were perfect, however. The head of course was wanting. There was no back-bone. The body was short; and while the arms and hands were quite completely formed, the upper arm was connected with the skin, tied down to the chest. The legs and feet were perfect. Of course the body was short on account of the failure of the back-bone.

Dr. Patrick. (Closing the discussions.) Mr. President: Those who paid attention to the reading of my essay must have observed that I left out the question which Dr. Black has illustrated on the black-board; for the reason at that stage of tooth development there is great obscurity and in questions of physics, I have as little to do as possible with mere belief and speculation. For the history of the past shows that nothing has done so much to retard the progress of scientific research in all its branches at the interference of speculations and beliefs, and especially when emanating from ingenious men. I did not intend to say a word about it, because I have not made it a special study, only casually. I found, upon investigation, for several years with the microscope, with all the accessories that I could possibly obtain at the time, that I was involved in speculation. I went back to the last teeth developed, and found them in the lower orders of animals, equivalent or homologous with the human being's front teeth, the lower animal developing in months what in the human being requires years. But I will say something in regard to the subject Dr. Black has illustrated, since the matter has been introduced. (Referring to the black-board drawing of Dr. Black,) We have here a drawing representing that the formative organ of the enamel of the tooth dips down from the epidermis, into the rete-mucosum, and there the enamel organ is met by a distinct projection of this deep-seated portion, and into which, by a system of invagination, it passes up into these enamel cells from the dermis. So it appears, according to this drawing of Dr. Black, the tooth is made up of the epidermis and the dermis, the epithelium and the rete-mucosum, the epithe-

lium dipping down to the rete-mucosum, and the rete-mucosum rising in form of a papilla projecting into the enamel organ by a process of invagination. Now this papilla, arising from the deep-seated portion of the mucous membrane, which is said to be the dentine organ, is of course supplied with nutrient vessels. Yet we find the tooth when in a saccular stage of development before the roots are formed; that the dentine organ is a granular mass of protoplasm without vessels; or at least, if the vessels are there, they are not filled with blood, there being no connection at this portion of the sac with surrounding tissue; for, while the fœtal tooth is in this saccular condition it receives its nutriment by way of the funicle or umbilicus, and latter from the cell wall. According to the drawing on the board, the sac would have to rise from the base of the papilla and, enveloping the enamel organ, make connection with the chord or funicle and then be detached with the chord when the enamel passed through the sac. (The speaker here pointed out the positions of the parts in the drawing on the black-board.) We do not find the condition I have just mentioned, and I defy anyone to show it in dissection. You can take the sac with the whole tooth, (Fig. 4) and turn it out and hang it down by its funicle and skake it out of its bone-cell. It has no connection whatever, except as I stated in my paper.

Again, if we take a tooth in its saccular condition and remove it from its sac we will find a granular mass of protoplasm filling the inner surface of the cusps of the enamel. Remove this gelatinous body which is to form the future dentine of the tooth, make sections and stain them as you will, and you will find nothing but granules. What has become of those vessels that arose with the papilla? Will absorption account for it? Now we find the tooth in a sacular condition receiving its nutriment by way of the funicle and by the cell wall; and later when the root or roots are near completion the apex of the root is entered by nutrient vessels, how is it possible for these vessels to enter the apical foramen before the root or roots are formed? We must dispose of these questions before we can accept the present advanced theories of tooth formation.

Dr. Sudduth attempts an explanation of some of these questions by saying that protoplasm is capable of forming tubes and blood

vessels; this we know, but it is not capable of filling them with blood, and the protoplasm that is to form the dentine is not revivified until it receives nutrient vessels, for a tooth is not an independent organism at any time, always receiving its life and support from maternal organs.

It is the opinion of some recent authors on this subject that a tooth has its origin from both dermas and epidermas. Yet I have the authority of Sodsir, Nasmyth, Huxley, Owen, St. John Mavert, Balfour and Gagenbans, who all say that a tooth must be considered as a true dermal structure.

It was not my intention to say anything about the origin of a tooth knowing well that the subject is a sea in which we all can swim, I have therefore felt very much like the old deacon in a Presbyterian Synod. A question arose about the building of Solomon's Temple and the visit of the queen of Sheba. There was no question raised about the building of the temple, but there was great difference of opinion as to where the Queen of Sheba came from. There were many eminent scholars present; a few Sanskrit, some Greek, and some Hebrew scholars. They of course had to show their learning, or what was the use of having it. The Sanskrit scholar commenced to look the distinguished lady up; the Greek scholar thought she came from Greece, and the Hebrew scholar claimed her, and so the debate grew hot; until at last, when the thing had very nearly broken up in a row, a good old Presbyterian elder got up and said:

"Brethren, I believe we are all united on the fact that Solomon was king?"

"Yes."

"And that a temple was built?"

"Yes."

"And there was a queen came to help him?"

"Yes, no dispute about that."

"Well, I think inasmuch as the temple was built and the Queen came to Solomon, it don't make any difference to us where she came from." (Laughter.)

OPERATIVE DENTISTRY.

BY LOUIS OTTOFY, OF CHICAGO.

MR. PRESIDENT AND GENTLEMEN:—Except on two occasions during the past seven years a paper on operative dentistry has been read at each annual meeting of this society. The custom of an annual paper should be continued, and may be improved upon by having a paper on prothetic dentistry also read at each meeting. The subjects embraced under the title of this paper, and the scope within which their consideration may be permitted is so extensive that in a paper of this nature only a partial review of the most important branches is possible, this will be done principally for the purpose of eliciting a profitable discussion.

The precious value of time should not be forgotten by the dentist in this fast, progressive age; and no matter how busy or idle he may be, even if no other appointment follows the work in hand, it should nevertheless be dispatched with precision. The cases presenting themselves should be studied with a special view of decreasing the amount of labor, and of shortening the time to the lowest minimum consistent with first-class service. The practice of introducing extraordinarily large contour fillings, those involving half, or more than one-half of the crown of a tooth is superceded by the use of either porcelain settings or entire porcelain crowns. Of the former class of work I have seen some beautiful specimens which appeared successful and promised much in the future, but I am not prepared to speak from the standpoint of experience. Crowns for anterior teeth are made as simple as possible, the simpler the better; wherever consistent the less gold is visible the more harmonious the appearance. For some years I have used the Logan crown. With the improved pin, for the majority of cases this is the best substitute on the market.

In selecting these teeth it is very important to secure one of proper size, one which will require the least possible grinding, especially where the articulation of the teeth is a close one, that the grinding to be done may be the minimum. When these crowns are fractured the fracture is generally in those cases where considerable of the crown had to be ground from the palatine or lingual surface, thus weakening the remaining porcelain. The trade does not provide properly shaped teeth for this purpose, and the dentist is obliged to shape them according to the various needs. As a rule, the root should be encircled by a well-fitting gold band about number thirty of the gauge, and twenty or twenty-two carat fine. This should be snugly adjusted to the root by first being made just a trifle smaller than necessary. It is then either stretched with suitable pliers, or by being forced on a slightly cone-shaped piece of steel until it assumes exactly the proper size. A little oil will assist in its ready adjustment. All the parts being perfectly dry the band is dipped in a thick solution of chlora-percha and forced upon the root. Within this band the crown is fitted to the root and the medium of attachment, oxyphosphate, is used. I prefer that the joint—all joints are liable to leakage—is either visible, or, at least, in such a position as to be readily examined. In crowns attached in this simple manner the principal joint is between the gold band and the artificial tooth, at a point where much loss must take place before the border of the root becomes exposed to danger. For the posterior teeth the all-gold crowns are beyond question the most serviceable. This, indeed, is also true of the anterior teeth, were not the unsightly appearance objectionable.

There are many suitable devices for making gold crowns, and Dr. Patrick's device is one of the best we have. Those who are not provided with the suitable machinery will find the seamless gold crowns and solid gold cusps very convenient for crown work. The root or tooth having been properly prepared, a collar of the proper size is selected and snugly fitted. In those cases in which the teeth articulating with the crowns are artificial, or where opposing teeth are entirely wanting, the cusps of the crowns may be shaped according to pleasure, but in those cases where natural teeth are to come in contact with the crown, a correct articulation

—one promising the best masticulating surface is imperatively necessary, and much care should be exercised in fitting the solid gold cusps or—where merely gold plate is used the cap—so as to properly articulate with the masticating surface of the opposite jaw.

In the place of excessive gold fillings, which not only disfigure the face, but are also more liable to require subsequent attention, and which are exposed to a greater number of risks, crowns are decidedly preferable: Within reasonable limits this practice can be carried further by thus capping instead of filling badly decayed bicuspids and molars with a cap covering either the entire crown to the neck of the tooth, or extending but half way. When the free margin is closely fitted, smoothly leveled and burnished, the possibilities of the cap or crown are much better than those of the usual filling.

Nothing new as to the use of gold for filling has become known to me since the last time when this subject was discussed by this society. I use cohesive and non-cohesive gold separately, or in combination, as the case may require. There is no doubt that much better and more permanent fillings can be made with non-cohesive than cohesive gold. The method of covering margin with non-cohesive gold and the most exposed parts of the filling with cohesive gold, is a good one. The margins of cavities are injured by the amount of pressure necessary to properly condense non-cohesive gold oftener than we suspect. The idea that a cavity must be plugged as tight as possible has undoubtedly led to much injury. Both kinds of instruments, with deep and shallow serrations, are necessary, the deeply serrated ones to be used in condensing the non-cohesive gold, and the shallow serrated ones for cohesive gold. With little practice the skill to secure a union between the cohesive and non-cohesive layers is readily acquired. Of course the union is entirely mechanical and must be thoroughly accomplished. Small cavities should be filled entirely with non-cohesive gold and hand-pressure exerted principally in a lateral direction, or at any rate only light taps of the mallet. For large contour fillings cohesive gold is preferable, and a skillful combination of the two will yield the most satisfactory results.

A few words as to the use of tin and gold foil fillings. This

combination has now been tested sufficiently to prove beyond a doubt that it has a legitimate place in dental practice. In anterior teeth, where the cavities extend beyond the cervical margin, to points where from any reason it may be impossible to properly fill or finish, it is the *sine qua non;* for it is readily introduced with sharply serrated pluggers, and where not accessible to sandpaper or cuttlefish disks or strips, it may be finished with smooth, flat burnishers, with the utmost facility. In teeth where the structure is much below the average, these metals combined are of great advantage, but should be used at the cervical margin only. The advantages and good qualities are counteracted, in a very slight degree, however, by the disadvantage caused by discoloration; care must be exercised and not permit a filling of tin and gold extend to any point where it may be visible, after the teeth have resumed their normal positions.

Discoloration, confined to the combined metals alone rapidly follows. In this instance at any rate, discoloration is due to electrical action, resulting in chemical changes, confined entirely to the surface of the combined metals, that is, to the surface exposed to moisture. The facing into the oral cavity of the metals, acted upon by its fluids, is followed by galvanic action between the layers of gold and tin, the action is rapid, and results in a deposit of oxide of tin on the surface. As complete dehydration of a tooth is not possible in the mouth, those surfaces of the filling facing the walls of the cavity are also acted upon by the moisture of the tooth substance, eventually resulting in a deposit of oxide of tin; this deposit made upon the filling, prevents further discoloration of the tooth, and fills the minute interstices which are liable to exist at the margins of cavities for which this class of fillings is recommended. It is in this way that the soft borders are preserved, and this fact has led to the impression, that tin and gold, when used in combination have a peculiar therapeuticle effect; as this is an error, no one should be deluded into the belief that the consequence of careless manipulation will be corrected by this kind agent

Margins must be prepared as carefully as for gold alone, and the filling introduced with thoroughness. I do not approve of the use of tin and gold for the small fissure cavities of molars and bicuspids, because gold alone can be used to better advantage in

these positions, nor do I approve of tin and gold, or tin alone, for those difficult buccal cavities of the molars, for which gold and tin has been recommended, because copper amalgam is far more preferable for cavities thus located. The latter can be introduced more readily, its discoloration is not more objectionable, and it can also be worked under moisture.

A better acquaintance with amalgam, has led many who strenuously opposed its use, to look upon it with more favor. The period of experimentation has long since passed, and the necessity for care in the introduction of amalgam being recognized, less negligent work is done with it, hence amalgams yield more satisfactory results. It is not material which of the better class of amalgams is used, provided it is properly mixed, introduced, condensed and finished. The use of properly adjusted matrices has made it possible to perform better operations at less expense of time and labor. Careful observations in many mouths having both gold and amalgam fillings, has led to the impression that good, conscientious operators, do not generally give that scrupulous care and attention to plastics which is betrayed on gold. This is often evident, for instance, when the cervical margins of gold or amalgam fillings are examined after the separation of the teeth, the latter will often be found to project beyond the border; to show either the file, cotton, or other finishing materials, marks and lines, while the gold will generally have a smooth powder polished, or at any rate, a burnished surface. It has often been said and it bears reiteration, that amalgam fillings, as a general rule, should be finished at a subsequent sitting. There is no doubt that physical changes occur during the "setting" of an amalgam filling which may alter its form or even position to some extent, and this alteration is in progress for many more hours after the introduction of the filling, than would permit of its being finished on the same day. An exception to the rule might be made in the exceedingly small fissure cavities of the molars and bicuspids.

At the second sitting the filling should be cut with a fine finishing bur, to or below the margin of the cavity, in such a way that it is hollowed out, more removed from the centre of the filling, than from the borders. The approximal surface should be contoured whenever possible. The cervical margin and the filling at that

point ought to be polished with the sandpaper disks and polishing powders as carefully as gold. At the time of the introduction of the filling, all loose fragments should be removed from about the mouth by the operator, these particles of amalgam, if allowed to remain, often float back, become attached to the filling on the approximal surface and the finish of the filling is made useless. Some persons are so phlegmatic, or the mucous membrane of the mouth is so insensible from artificial stimulation, etc., that they do not discover these particles of amalgam, and allow them to float about the mouth for hours.

Lately copper amalgam has received considerable well merited attention. A number of fillings under observation yield variable results. I have placed it in mouths where no other kind of fillings were inserted; have placed it along with other amalgam fillings in mouths where gold and amalgam fillings already were. The change of color has been variable, in some cases entire discoloration of the copper amalgam being the result, while in others it remains bright and smooth. In cases where a number of different kinds of metals were used, the principal complaint made was in regard to the marked metallic taste, especially when sour food was eaten. In one particular instance where four months ago forty cavities were filled, twenty with amalgam, eleven with gold, five with copper amalgam and four with oxy-phosphate of zinc, the metallic taste has continued at all times. The patient is not aware that copper has been used, but claims that she is conscious of a coppery taste at all times.

The fine copper amalgam fillings are very large and are in the second and third molars. The greatest advantage from the use of copper amalgam is derived when it is employed in saving those molar teeth whose cavities extend below the cervical margin, are so difficult of access and almost impossible to keep dry. It unites particle to particle and sets fully as well under moisture as when dry. Like the other amalgams this class of fillings should receive a careful finish, not so much for the sake of a polish as to have a smooth surface, preventing the attachment of food and viscid saliva.

Gutta percha and oxy-phosphates have retained their past usefulness and popularity as suitable filling materials for temporary

purposes. Oxychlorides (except when not to be exposed to the action of the fluids of the mouth), I believe, have been entirely abandoned. It is not yet time to pronounce any article, whose principal constituent is either gutta percha or phosphate of zinc a fit filling material promising permanency. Recognizing the demand for a suitable filling material as readily introduced as are the gutta percha and oxy-phosphates, the American Dental Association appointed a committee last year to consider whether the association shall offer a prize of $500 "for a dental cement which shall more nearly approximate gold in resisting the action of the secretions of the mouth, and most nearly approach the color and non conductive properties of the natural teeth." Many of these preparations now on the market, under certain conditions and in certain positions, remain unaffected for a long time.

A comparatively dry mouth, with a neutral condition of the saliva, is more conducive to the permanency of oxy-phosphate than a mouth in which the saliva is acid or alkaline and viscid. When introduced as temporary stoppings—not often necessary—they should be finished with a view to permanency, because frequently patients neglect attending to teeth filled in this way as soon as they should. For lessening the labor of filling large cavities oxy-phosphate is of untold value. Cavities can be filled with it almost full, and gold or amalgam used for finishing. In this way the smaller quantity of amalgam used diminishes the liability to shrink, and this insures a better filling of large cavities. In my practice, gutta percha is not used extensively, and whenever used, takes the place for some good reason, of the cement fillings. It is generally resorted to on the approximal surfaces of the teeth, especially if molars and bicuspids, for separating teeth, occasionally for retaining medicaments in diseased or pulpless teeth, and for pressing out of the way soft tissues where they extend into a cavity.

Another important branch of dentistry to which I desire to call your attention for a few moments, is the treatment of pulpless teeth, especially those which are, or have been, affected with alveolar abscess. Within the last few years a good deal has been said in reference to the immediate filling of the roots of pulpless teeth irrespective of the previous condition, and possibly a lack of

proper discrimination as to the suitableness of particular cases, has led to unfavorable results. To treat and fill at one sitting the root canals of any tooth whose pathological condition is not fully understood, is absurd, and if persisted in, must be followed by unfavorable consequences. The practice whenever resorted to demands cleanliness, care and thoroughness, unquestioned purity and reliability of the drugs employed, and a favorable prognosis. Abscesses with fistulous openings are readily treated, and usually prove permanently successful, but when for any reason an abscess recurs, no one should resort to the abominable practice of drilling a vent-hole. I have recently seen several cases of this kind, and trust that none will ever seek to relieve an abscess in that way. In the treatment of abscesses the use of potent, powerful drugs, which in addition to destroying diseased portions also destroy the healthy tissue, should be carefully avoided. Remedies which cleanse and which destroy germs are generally less unpleasant to use and are fully as effective. We should also studiously avoid over-treatment, one good, thorough application of a drug once a week will yield better results than too frequent applications. This is true of the treatment of the pulp, gums and other tissues as well. The necessity of saving all pulpless teeth, if they promise a reasonable amount of service, must never be overlooked. To retain the vitality of an irritated, inflamed or exposed pulp, is one of the most difficult operations a dentist is called upon to perform, for it is an operation which calls for the exercise of much judgment, and yet is most frequently followed by unfavorable results. It is my practice to endeavor to save the pulp in all cases presented, if under fourteen years of age. At this period of life the possibilities to retain vitality of the pulp are the most favorable, and only as age increases do the chances decrease. Here too, avoid overdoing, during treatment prevent, if possible, pressure on the pulp, and cap with uncorruptible pliable substances.

If the exposure is of but very short duration and not has caused much pain, the removal of foreign substances, washing with tepid water and dusting with iodoform can be immediately followed by capping with several thick layers of chloro-percha and oxy-phosphate of zinc. Before endeavoring to ascertain the condition of a tooth-pulp, flood the cavity with bichloride of mercury,

one in five hundred, it having been first dropped on a warmed slab to prevent a shock, remove all decay, do not wound the pulp unless pus is present; if this is the case, puncture and allow the pus to escape, wash with encolyptol, dust with iodoform and cap immediately. Pain should not follow the capping of exposed pulps. When the inflammation of the pulp has been of some days standing and the pulp is gorged, care must be taken not to permanently seal it too soon. Generally two or three treatments will suffice.

In conclusion, gentlemen, I need but call your attention to the use of matrices and separators. Their intelligent application saves time and assures better results. Nor must we forget the various ingenious appliances now manufactured, to be used with the much-abused engine. Well chosen sand-paper and cuttle-fish disks will save time in finishing and polishing, so will brush-wheels, rubber disks, rubber corundum disks, wood points, chamois and celluloid disks, moose-hide, sole-leather, rubber cups and many other of these appliances; they should be always at hand and employed to the best advantage. The revolving instruments are less objectionable to patients, perform the operation more rapidly and yield better results.

A careful consideration of these subjects in the form of discussion is the principal object of this paper, and for that purpose I now leave the matter to your consideration.

DISSCUSSION.

OPENED BY DR. WASSALL.

Dr. Wassall. Mr. President: The subject of Dr. Ottofy's paper, Operative Dentistry, is a very comprehensive one. He has chosen to speak of a number of different subjects in operative dentistry, but has omitted a great many others which are quite as important. He evidently intends us to discuss merely the ones he has referred to.

The point he made as to the time given to operations is a very good one. It seems to be the tendency of operators in full prac-

tice to reduce the time of operations, both for their own pocket's sake and to save their patient's time. I would utter a word of warning, however, to operators of short experience that they do not hurry their work too much, that they do not push it along faster than they can follow it, that they do not sacrifice thoroughness to speed. I know that I have occasionally fallen into that error myself.

There is always a danger, in operative dentistry, in doing too much in contour, and there is also another danger in not doing enough. It is often a very nice point to decide whether a tooth shall be crowned or filled.

The tendency just now, as taught in Dr. Ottofy's paper, is to "crown" rather than to make large contours. I should rather incline to making large contour operations in young patients than to removing the crown, providing even it will last but a few years. If we are certain that the filling will preserve the tooth for say five years, in a young person, I would prefer to make the filling. The crown will come soon enough.

In regard to crowns there is to be a paper on that subject, but since the essayist has noticed it, I will say that from his description of the Logan crown, and from others who speak very highly of it, I have had no experience with it myself—I should be inclined to doubt that it is the best crown for front teeth.

From my observation the gold crown with the porcelain front, that is, a plate tooth backed up with gold to the cutting edge, with the collar encircling the root, and the dowel, makes the best crown. That is my experience and observation. The all gold crown for back teeth—and I coincide with the essayist, is the most enduring of all crowns.

He has omitted to speak of bridge-work, and of course that is a very fertile subject for our discussion, if the society wish to go into it. I can see in it a great field of usefulnness. I would of course utter the same note of warning that others do, to avoid "bridging" in cases not adapted for it. This must be left to the wisdom and judgment of the operator.

The subject of gold is a very important one to dentists, and Dr. Ottofy has passed it over without very much attention. We have said very little about it in the society in the last few years.

It is the material we use most, and no doubt there are some new ideas on the subject that ought to be disseminated, and I think a discussion of that subject would be helpful. It seems to be a general rule with operators to use soft gold at cervical margins and finish the filling with cohesive gold; some use the combination of gold and tin at the cervical margin only, and some throughout the filling. Of course the combination is not new. It has been used for many years. I have seen it mentioned, as having been in use as far back as forty years ago. The utility of gold and tin no one can doubt. I am not positive in my chemistry, but I think that the essayist was in error in attributing the discoloration of the tin to oxide. My impression has always been that it was the sulphide of tin, instead of the oxide. That is a small point here however.

In regard to gold I suppose I am going back to first principles, but I have just found out a gold that pleases me wonderfully. I have used the William's cylinders for about seven years until within a few months. About the first of January the late Dr. Geo. O. Howard recommended to me Hood & Reynolds' cylinders. I find they work very soft, very much easier, and in some respects like the velvet gold of S. S. White or the Wolrab cylinders. The gold in two styles loose rolled (A) tight rolled (B). Style B cylinders are adapted to cavities where you need soft gold, especially at the cervical margins of approximal cavities. These soft gold cylinders are rolled very tight. There is a great deal of gold in each one; and they work as soft as the other cylinders, and pack down dense and firm. You will find it a great help, to have them in your case, to expedite filling operations.

While I am speaking of gold I should like simply to suggest that the heavier foils, from Nos. 20 to 120 rolled, are not used as much as they deserve. They give a hard surface—a surface you can be certain of.

Amalgam. There is nothing for me to say about amalgam except to emphasize the point made by the essayist that the polishing should be done at another sitting, and should be done thoroughly. You will thereby get the chance to see them and to know that they have not been disturbed while soft, and have a chance to remedy any defects from that cause.

Copper amalgam is the latest hobby in America, in amalgams. I think it has practical value, from what I have seen and used of it. There is something very gratifying about looking at a copper amalgam filling on the buccal surface of a third molar. Such fillings after hardening seem to hug close to the margins and to be just where you put them; after they have been polished there is something about them particularly pleasing. The moral effect of a copper amalgam filling in such a place as that, is good on me. I like to see it. (Laughter.)

Of cements I wish to say that I think there are two secrets in their use that will give us greater success with them. The first one is to take just enough of the plastic material on the instrument to fill the cavity and burnish it until it is just exactly full, so that it will not need to be cut or ground down after it has hardened. This leaves a surface which has an outside gloss to it, of a condensed vitreous nature. The surface of a celluloid plate formed over a tin model will better withstand the action of the saliva, and will wear very much better than if it is polished. It is the same with cement. If you can shape it while plastic, and leave it with the peculiar surface that the burnisher gives, it will withstand wear and the action of saliva better than if it is polished after it has set. That in my experience is one secret. The other is to give the cement more time in setting before the rubber dam is removed. It was Dr. Harlan who told me that he allowed the rubber to stay on, as an invariable rule, one hour, after making a cement filling, and I have followed that plan in a majority of cases since. I find it is possible, in most cement fillings that I make, to put the rubber on another tooth which may be filled with gold probably after making the cement filling. Or the rubber dam holder may be removed, letting the rubber hang and another rubber may be adjusted in another place. Otherwise the patient should wait the full time while you go on with another appointment. I notice that the cement fillings I have made since I have adopted these two points have been very much better than they ever were before.

I have but one thing to say about pulpless teeth, and that is in regard to those with fistulous openings. Many speak of these as their simplest cases, saying they are easily cured, that you can fill them at once, and that they are suitable cases for immediate

root filling. I differ from such teaching entirely. Such cases, when filled up at once, often result in the gravest consequences. I have seen such results. In many instances the patient may get along all right; but chronic abscesses with fistulous opening are just the ones where there will be a large pocket at the end of the root. If you attempt to cure them, you will not succeed unless you open into the socket, into the apical space of the tooth, and remove the end of the root by the proper surgical procedure. I call to mind cases of this kind that have caused serious neuralgic troubles, and caries and abscesses that have involved the jaws deeply and extensively.

Now as a simple method of discovering whether there is an abscess cavity at the tooth's apex pass a broach through the end of the root. Many are inclined to be cautious about passing a broach through the foramen of a tooth which is in trouble. They think it is liable to produce difficulty. It is, very often; but where there is a fistulous opening, and a chronic abscess, it is best to take this course and find out whether there is an abscess cavity. A true diagnosis is all important. You find it out in this way: pass the broach to the end of the root. You can generally estimate about how far the broach ought to pass before it reaches the end of the root. If you cannot push through the apex drill through it, and if you find there is sensitiveness immediately when you get through, it indicates healthy tissues. You know that there is no abscess cavity, and you can go right ahead and fill without danger. But in many of those cases you will find your broach passing on and on, and you know it is passing into a cavity where there is no living tissue. That is the danger I wish to point out in pulpless teeth with fistulous opening and a simple means of detecting it.

Capping exposed pulps Dr. Ottofy thinks is always advisable in young people, under fourteen years of age, because he is most successful in those cases. I think he could also give another reason, viz: that it is also most necessary in such cases. The pulp is the most useful to the tooth during its formative stage. The tooth is not thoroughly calcified until adult life is reached as a rule. The odontoblast should be permitted to perform its lime depositing functions by keeping the pulp alive until the age of eighteen at least.

DR. CROUSE. Eighty!

DR. WASSALL. No, sir, eighteen or twenty is old enough. We are to have two papers on this subject and possibly it is not best to say so much on the subject of pulps.

As to matrices and separators, those are two appliances that I have used a great deal and get a great deal of satisfaction from. I appreciate the threatened dangers from both these appliances and of course it is not necessary to point them out. There are many ingenious things for this purpose, and you probably have all tried most of them.

To wedge teeth I use the waxed tape. Dr. McKellops is not here. I am sure if he were and this subject came up he would say "waxed tape," and say it loudly. It is the thing for separating teeth that above all others pleases me. You get it in all sizes up to three-quarters of an inch, wax it with yellow wax and use it double or single. You can give it to your patients to use. It separates the teeth not by swelling after it is placed between them, but by the pressure which you impose in putting it in. You make them give just so much when you put it between them. The teeth then have a chance to adjust themselves until you change the wedge which they do with entire absence of soreness as a rule. It is sometimes necessary to begin by inserting rubber. Patients will always be very glad to have the tape used after having a piece of rubber in the mouth for a day of two.

I hope that Dr. Crouse will tell us something of his method of managing patients, of studying their cases when they first come to him and of the way in which he decides upon the best course to follow in a given case. I had the great pleasure of hearing him talk on this subject coming down on the train from Chicago, and he instructed the few of us who heard him very much.

DR. TAYLOR. I wish to speak of the uses of gutta percha. One is in cases where some dentist has bored through the root or between the bifurcations, looking for the pulp canal. We may not have such instances occur in our own practice, but we may have them come to us for treatment. You know they are apt to annoy after being closed up. I have found that in several cases by thoroughly drying and disinfecting, and filling the drill holes with gutta percha, no bad results took place in consequence, be-

cause of the kindness with which the material is received by the soft tissues. Another place for the use of gutta percha is in capping nearly exposed pulps. It is to be preferred to any preparation of zinc because it is a better non-conductor. Another is in some of the deep buccal cavities, where it may be questionable about applying metal at all. It is praticable to use gutta percha as a permanent stopping in such places.

In reference to cements, my experience has led me to think they are often not thoroughly mixed, not stiff enough.

I believe a phosphate filling is always injured by burnishing, but if you will bring a steady pressure against it until it is set or nearly so, you will have much better results than by attempting to disturb it while it is in process of crystallization. The latter course results in a filling which is crumbly and easily affected by the chemical changes that take place in the mouth.

Dr. Crouse. Mr. President: You will remember that I have not spoken before this society for two years, because I have not been here; and if the members are not too tired I would like to discuss the subject of operative dentistry, not from the standpoint of crowns, or amalgam, but how to treat our patients when they come to us. I will illustrate it by one or two cases which will be typical of many in a general way.

The most important thing that the operative dentist has to do with in all his practice is the diagnosis of his case. I do not mean by that, to find out how many fillings are to be made, though that is one thing, but I mean he should examine the mouth carefully and if the teeth are much decayed try and find the cause. If the patient has had a great deal of work done and failures exist around fillings, he should ascertain whether the difficulty is with the operator, with the character of the teeth or with the patient himself. That will involve several questions. It will involve the question of temperament, his slovenly or careful habits, the instruction or non-instruction which he may have had, all important matters. The patient should know how to take care of the teeth, and this is one of the first things the dentist should teach the child, with the assistance of the parent. If you cannot have that, dentistry is a failure. So it is most important to take these different questions into consideration. Another thing not to be forgotten is the condition

of your patient's pocketbook; because we can have operations we may call conservative which would suit one class and not another. When a new patient comes to me I select a very easy operation for the first. I wish to see what kind of a patient he is going to be. If your patient says, "My teeth are very poor, I have had them filled and re-filled and they just decay around the fillings, and I have always had the best work I could get," and if on examination you find deposits of mucous, fungi and other uncleanliness between the teeth, you can very readily wake your patient up to another side of the subject which perhaps has not been presented to him, namely, that he is to blame, and that the rapid decay of the teeth is his own fault. You can readily convince him by giving him a hand-glass, and with an instrument showing him these deposits about the necks of the teeth.

All this can be done delicately and without offense. I have many times called the attention of my patients to these conditions, and for the first time they seemed to realize the importance of more thoroughness on their part. They had supposed they brushed their teeth but *they did not know how.* Half the dentists, I believe, scarcely know how to brush teeth in the right way, and their ignorance is responsible for a great deal of trouble and dental caries. The next question is, "Do you approve of the toothpick or no?" In some of the highest and most stylish—or I will say the most *stylish* circles—it has been taught that it is very vulgar to pick the teeth, and so the patient, if she is a lady, will often say, "I dislike very much to see people pick their teeth." "Yes," I say, "but I dislike something else still more," and so with the floss silk between the teeth, I show her that instead of being dainty she has been very negligent.

Sometimes it is very well to let the patient go for two weeks and then see what the effect of that first lesson has been. If you find the teeth clean or comparatively so, there is room for great encouragement, and you can go on with your operations. If now you can possibly find some place which he has missed, show it to him again, and you will have accomplished a world of good. I make appointments with boys many times, in connection with their parents, simply to have them come in and see if their teeth are properly cared for, and by watching and teaching I succeed in get-

ting them to do their part. Very often I find that I can get up a very wholesome ambition in a boy so that he will be determined that he will have his teeth perfectly brushed. When he thinks he has, if you will find several times some place he has missed, you will have made a pretty good start in thoroughness.

Dr. Wassall referred to what I had said on the cars coming here. I illustrated how I would undertake to teach a naturally careless boy. I had a boy to keep an appointment. I had not seen him for two or three years. He sat down in the chair and I said, "Willie, your teeth are in an awful condition, you have not brushed them." He said, "I never do." "Why don't you, your mother tells you to?" "Yes, but I won't do it, I never do." "Aren't you going to?" "No, I won't." "Well, you may get right out of here! Take your hat and go home, I don't want you here at all!" He looked up in great surprise, and I said, "I mean it, I want you to get right out of here, I would not work for you for one hundred dollars an hour." So I sent the boy home. Then I went to the telephone and told his mother that I had sent him home, that I had made an appointment for him in two weeks, but I had not told him; that I wanted her to send him then; but in the meantime if she could in any way get him to brush his teeth to do so, that I should not fill any teeth for him in their present condition. The next time he came his teeth were brushed as well as any boy's I ever saw. He was thoroughly waked up to his duty; and I have no cleaner mouth in Chicago to-day in my practice. That was three years ago, and I see the boy very frequently more often than is necessary because he fears he may get careless. These things are quite as important as the consideration of what you shall put into the teeth.

If when your patient comes to you there has been a large amount of Arthur's separating—which many of us know more about now than we did at first—if the patient has been chewing on his gums till the necks of the teeth are exposed and sensitive, I should contour those teeth and give the person something to chew upon beside his gums—give him something with which to masticate his food and prepare it for his stomach. I know of no service a patient will be more grateful for than this.

If you find you cannot get cleanliness and care you had better

not waste your time and energies and patience in contouring, for decay will begin again at the necks of the teeth if the food is not kept out.

There is one class of teeth which should hardly ever be widely separated, where there is trouble simply at their necks. If you make a separation there you have a large pocket with nothing to obstruct the food from entering, making the patient uncomfortable and mastication very imperfect. The patient will avoid chewing the kind of food he ought to have, because he hasn't anything to chew upon with comfort. Such teeth, I repeat, should never be separated.

If your patient is careless it makes but little difference what you fill the teeth with, they will decay again. You may be careful, but your care will be rewarded with little success. Of course I have seen mouths where there had been no brushing done and yet no caries, and it has been a mystery to me. Some will tell you they never use the brush and none of their teeth decay; but these are the exceptions. Now I speak of this cleanliness and these instructions to the patient, and particularly to children, as the most important thing the dentist has to do, in my opinion, in his practice. If you once get a child aroused to a sense of his duty, so that when you look in his mouth he is proud to have you do it, you have won a most important victory. I have had children come to me to whom I could truthfully say, "You are brushing your teeth nicely. Your gums look solid and clean, and there are no cavities." And this I believed to be a result of the care I had instilled into them.

For contouring, I think the Parr separator the best of any in the market. It will move the teeth apart in most mouths as far as the interspace of the first molar and second bicuspid. With this separator the process of long wedging has in my practice very much lessened. But it is not available in every case. There are some to whom it gives much pain, and with such we should use it very cautiously. There is danger of exciting so great irritation of peridental tissues as to hinder the thorough packing of gold. But after wedging and filling we may use the separator with

great advantage to finish; leaving the teeth so contoured as to avoid the space which so often annoys the patient and prevents thorough mastication of his food.

With the disks and other appliances that have come into use within a few years it is much easier than it used to be to finish a contour filling. By using an instrument to turn in the disc at a point where it will not otherwise reach, having the patient hold away the dam, we may finish our operations with safety and satisfaction. I do not mean to imply that the operation is easy, or quickly done. It requires time, patience and energy on the part of the operator, as well as endurance and patience on the part of the patient; but when we have finished the patient has an operation he will be very grateful for.

Tin and Gold. There are many members of this association some of whom are present, who will remember when I used to advocate the combination of tin and gold down at the cervical margin. I am not using it as much as I did. I have found some failures resulting, either from the formation of oxide of tin, or the reduction of the tin proper to a powder at the margin. In some mouths it does not seem to act that way, but in others it is not well to use it, on account of the acid found about the necks of the teeth.

A Member. Tin alone at the margin, or tin and gold?

Dr. Crouse. Well, both forms, usually a good deal of tin at the margin, often filling half of each proximal cavity with it and then finishing with gold. I would rather use soft foil cylinders at the margin. I can put them there almost as quickly. It takes a little longer to finish but not much, with the sand-paper disc. As a rule I prefer to make these cylinders myself. Taking a nicely rolled cylinder, I set it up on one side of the cavity, then one on the other, then a big one in the center; and with a broad instrument condense the mass. I know of no better way to begin filling a large cavity than this. The making of the cylinders takes considerable time but I like to do it. I roll the foil into cylinders of different lengths, so that I may at any time find the size I want. It is an excellent plan to have the ends extend over so that you have plenty of surface, and in finishing them, after taking your plugger and driving them right home, you have a result that will make you glad.

I never found ready made cylinders quite what I wanted for miscellaneous purposes. I had Williams make them purposely, but I have dropped back into the old way. When I roll them myself I know how tightly they are rolled. We want them differently rolled for different places. If we wish to drive a cylinder up between two others we want it tight, like a wedge, so that it will drive them to the side. It is surprising to see how they will wedge. A mistake that has been made by many operators is that they condence the first *cylinder too much.* They think they must keep condensing, and so they do till it will roll out of place. While condensing the cylinders we may insert a piece of cohesive gold if we want to contour, and a very elegant operation can be made.

A foil I like very much is one that you can make cohesive by annealing. I apprehend that there is much more of the foil on the market than we think that is not pure. Since we began the refining of gold in our office, I have made several tests and I was quite surprised to find some foils that I had supposed were pure, were not. I think this is true of the Globe foil, which I have used a long time, that it is not as pure as it used to be. I am using now the Kearsing gold. That gold is not absolutely soft. It is not as soft as the Globe soft foil used to be and yet it behaves nicely under the instrument and does not get sticky. I am very much pleased with it. It is best to give him directions very minutely as to what you want, and you will get it. I think him one of the best foil makers to-day.

I used heavy gold pretty extensively a few years ago, 60, 120 and even higher. I think we had 240 at one time. There is no question but with heavy gold, as good a filling can be made as ever was put into a tooth, but it takes too much time. I see now and then some of these fillings that we put in sixteen to eighteen years ago with that heavy gold. They stand up there yet in good shape, and it is quite encouraging to think that I did not waste so much time on them after all.

I have been using nothing heavier than 60 gold for a number of years, but there is no question about the fact of being able to make an elegant filling with heavy gold. I now use and I like the number 10 Kearsing gold better. I take two sheets and fold them so that I get about eight thicknesses in strips; fold it

evenly and cut it into strips. It is very cohesive, makes a nice surface and can be worked readily. I also think favorably of William's gold, and it is just as good, probably as Kearsing's.

I wish to say something about a pad which I had the printers make for me and which I have on my operating case. When a patient comes in for the first time I get his name and address and then as I make my examination I mark with a pencil where the fillings are to be. When he comes again my assistant gets this pad and hunts out the page. There are fifty in each pad. I mark with a pencil or pen and ink the filling I have put in, the date, the hour and the time consumed, so when I come to make a charge I have a complete memorandum. If there has been anything peculiar about the case I make a note also of that. All this is copied by my assistant on the diagram in my ledger.

AMALGAMS.

BY W. B. AMES, CHICAGO.

I do not propose to argue the claims of amalgams to recognition as filling materials. Were I possessed of the eloquence of a Clowes or a Flagg I might expatiate on their virtues, virtues not born of the materials themselves, not born of their nobility, high character and staunch integrity, but most often of their susceptibility. Suffice it to say that I am a champion of the plastics and although I cannot embrace all of the doctrines of the "New Departure," I can in looking through the "spy-glass" get about the same perspective as do the illustrious trio. Their familiar tenet, however, has always had the ring of ambiguity and has been the cause of the gentlemen being much misunderstood. A better wording, to me, would be, just is proportion to the difficulties of making a filling that will check and hold in abeyance tooth distruction, is the use of gold contraindicated. With this as your article of faith, with this as your axiom, it is a question in a given case, first, what is the quality of the tooth structure, and next, what is the nature of the difficulties to be overcome. By recognizing these conditions, recognizing your personal abilities and shortcomings and being familiar with the physical characteristics of the different materials available, it is usually easy for the eclectic practitioner to decide on a method of procedure.

If there were such a thing in reality as "Plastic Gold" we would have in it a material that would extend in some degree the plane of usefulness of gold as a filling material; but as plasticity in gold is a delusion and a snare except in so far as it is malleable, the so-called Plastic Gold will help very little toward the solution of the problem of easy manipulation of this material.

Easy manipulation of a material of stability of form, sufficient density to withstand attrition and of a nature to insure harmonious relation with surroundings (not necessarily electrical) is the solution of the question of practical tooth-stopping. Have we in gold such a material? In certain cases we have. In contour operations on account of accessibility, a good adaptation of semi-cohesive gold to cavity wall is usually easy of accomplishments and if the tooth structure is such as can be in harmonious relations with as dense a material as welded gold the operation is practical. Then, many proximal cavities not fully accessible and crown cavities, may be filled with non-cohesive gold or a combination of non-cohesive gold and gold more or less cohesive and still rank as easy and practical operations. But in the operations which are legion, in which we have not this accessibility, not this tooth structure which can be in harmonious relations with an *impacted* gold filling, some other material must be made use of. What will it be?

In the combination of gold and tin we have a material allied to the plastics in that on account of the sliding of the layers upon each other its manipulation and its adaptation to cavity wall is easy and the peculiar change taking place (from primary and secondary galvanic action as I think) transforms it into a homogeneous mass. But the use of this combination is limited to a few locations and in appearance it is little better than the blackest amalgam. In gutta percha we have a material only reliable for fillings exposed to the minimum amount of attrition and impact, tin foil ditto.

Cements, although valuable as adjuncts are seldom to be relied on of themselves for permanent results. Than why is not an amalgam which is easy of manipulation, sufficiently dense, plastic during impaction and which makes a mechanically perfect stopping, an ideal filling from a thoroughly practical point of view? Have we such amalgams? I have become satisfied after a rather extensive series of experiments in the mouths of my patients and in the laboratory that we have amalgams available which fulfill all practical requirements. From the conclusions forced upon me after making these tests, I realize that in the work of the New Departure trio ten years since we were given many valuable truths, and that by the investigations of J. Foster Flagg especially we became informed on many points that had not been so definitely

brought out before, also that very little has been added to our general knowledge of plastics since the publication of his works. We cannot go back of his conclusions, that in the heavily tinned amalgams we get bulging or spheroiding and in the heavily silvered amalgams containing a per cent of copper we get very little change of form during crystallization even when carelessly manipulated. Of amalgams containing cadmium, zinc or antimony, I think we care to know little. He mentioned the crepitation indicative of silver, the plasticity resulting from large proportions of tin, and the control of change of form coming from an admixture of copper, and many other points which put us in the way of judging of the qualities of alloys and amalgams from their manipulation.

Whether gold as a constituent of an amalgam is of value or not does not seem to have been very thoroughly investigated as yet. From my own experiments I have been led to believe that one effect of gold in an alloy is to render the amalgam made from it very dirty, although an amalgam made from pure gold and pure clean mercury is a beautifully white and clean material.

I have recently made a series of tube tests, using flattened tubes, not with a large variety of alloys but with a few, the composition of which was approximately known. Among the conclusions arrived at was that a good moisture tight filling can be made by a careful use of many of the higher grade of alloys and that in the use of some of the lower grades, (although there should be no excuse for their use) a benefit can be derived from a certain manner of manipulation that has not been mentioned. I find with these heavily tinned amalgams an increase in the amount of form change in proportion as the alloy is thoroughly amalgamated, i. e. one amalgamated just sufficiently to admit of packing will change form less than one made thoroughly homogeneous by continued trituration. Of course, in this partial amalgamation we do not get the full edge strength possible in the material so that little good can be derived practically from such manipulation. This observation, however, strengthened with me a theory that silver and copper in an alloy control change of form in an amalgam by becoming only partially amalgamated at once, the solid particles that remain acting as braces to prevent the change of form incident to the plasticity of the tin which they contain. Assuring this to be true, crepitation is easily and reasonably accounted for.

The pure copper amalgam used extensively and to good advantage in Europe for a long time and more recently in this country, would, according to this theory, be the excellent filling that it is. In this combination of precipitated copper and mercury we get a peculiar plasticity from the amalgamation of the molecules of the copper, but yet the individuality of the molecule is not destroyed, and we have yet, I believe, innumerable solid particles of copper with an amalgam surface, the unamalgamated part of the molecule acting as a brace against its neighbor to prevent change of form, which would take place in a homogeneous mass. This may be unscientific, but I believe the entire question can be made to harmonize by studying the contouring weights, specific gravity and chemical equivalence of the metals used. I have arrived at this conclusion so recently that my ideas are insufficiently formulated to offer with advantage; but hope to present them in the near future.

There is an amalgam which I wish to call your attention to that I do not think has been well understood, judging from what I have found in print in reference to it. I refer to amalgamated platinum. Not what is commonly called "platinum alloy," in which a small percentage of platinum may be contained with large percentages of silver and tin, but *amalgamated platinum*. Several authors who mention the metal in connection with amalgams say it is very difficult to amalgamate, which is true, and also that its effects in an amalgam are questionable. Flagg places it last in his list of metals at all desirable. Now having produced platinum amalgam I have found it to be possessed of several good qualities that I have never seen attributed to it. It is an amalgam which of itself remains permanently plastic, and this seemed at first to seal its doom, but on trying it incorporated with other amalgams I found that it imparted very desirable qualities, so that now I value it more for its permanent plasticity than I would if it did of itself become hard. By having it in the form of a metallic paste a certain quantity, ten, twenty-five or fifty per cent. can be incorporated with another amalgam and its peculiar effects secured. The valuable effects of platinum in such an amalgam are that it imparts to the mass a tough, leathery consistency not derived from any other source, and although it does not crystallize when used alone

with mercury, it seems when used in a less quantity than sixty per cent. to hasten the crystallization of other amalgams.

To the feel it is of an unctious, buttery nature, somewhat adhesive and when pulled upon will draw out slightly like taffy, thus being entirely different from anything else in this line. I have made many experiments in the mouth with the material, using it in different proportions with other amalgams that would give a hardened mass. Thus I mixed with platinum amalgam enough gold to cause hardening. This gives a mass that has many of the desirable qualities for manipulation but does not for some reason have a surface color in the mouth that would justify its use. I have mixed small quantities of palladium precipitate with the platinum amalgam which gives a mass that hardens more or less quickly according to the amount of palladium used; gets rather hard and retains about the color of pure palladium amalgam, which I have found to be a sort of gray instead of black as some have stated. I have mixed platinum amalgam with amalgam from the alloys, and found that it imparts to them its toughness and I fancy hastens setting.

The mainstay of my amalgam work for several years has been the pure copper amalgam I commenced its use in 1881, on the recommendation of English dentists through Drs. Harlan and Dean. Commencing its use very cautiously and observing results I soon became imbued with a faith that has grown with use. It is with this material that I have obtained the most valuable results from an admixture of platinum amalgam. I have used this experimentally in all proportions from 90 per cent copper, 10 per cent. platinum to 90 per cent. platinum, 10 per cent. copper. When used practically in about equal proportions it imparts the tough, leathery consistency and hastens setting to such an extent that a filling can be nicely trimmed and burnished at the time of its insertion. I often fill a cavity full with the copper amalgam and then scoop out the part that is usually left soft from the mercury coming to the surface and with this incorporate an equal amount of platinum amalgam, which when placed upon the surface will give the consistency mentioned. The color of a platinized copper amalgam filling is what you would naturally expect from the combination, it is bluish white while plastic and the hardened

mass in the mouth turns less intensely black than the copper amalgam when used alone without washing.

I will say here that I have found that the surface color of copper amalgam can be very much improved by washing with alcohol. However carefully it is heated there will be more or less of free copper left from the mercury being driven off, and it is undoubtedly from the oxidation of this free copper while hot and the oxidation and sulphureting in the mouth that the discoloration comes. By thoroughly washing the plastic mass in alcohol the oxide is either dissolved or reduced and a thorough amalgamation again obtained, which will give a filling that will not turn much darker in than out of the mouth. It may be said that in washing this amalgam we do away with its most valuable condition, the presence of the salts of copper, which we have come to look upon as of benefit to frail, soft teeth. Be it so, then it is only when filling very soft teeth and near the pulp that the presence of the salts is called for, and in teeth of medium structure or above we may by thoroughly washing a copper amalgam make a mechanically tight stopping with a fairly good color.

Precipitated palladium has been brought into a more prominent position recently as a material for amalgam by being placed upon sale by a prominent dealer in supplies. I cannot see that this is a valuable material when used as recommended, i. e., the palladium and mercury combination, but I have found it to be of value as far as working qualities are concerned, in causing a more rapid crystallization of other amalgams. Palladium amalgam sets altogether too quickly for practical manipulation, but when mixed with other amalgams it only hastens their setting in proportion to the amount used. As to other effects I cannot say, but we naturally expect with an amalgam that will take a burnished surface in a few minutes that good results will follow. To incorporate precipitated palladium with an amalgam, a small amount should be placed in the hand or a mortar and rubbed up, simply enough to break the little lumps and to facilitate getting it distributed throughout the mass of plastic material which is placed in contact with it. If the precipitate is added directly upon a mass of plastic amalgam without taking the precaution to first distribute it, an even mixture cannot be obtained and a lumpy

mass will result on account of the rapid setting of the lumps of palladium after combining with mercury.

In filling lower teeth I have used this material by first filling the cavity with some amalgam, then adding a small quantity of the precipitate and rubbing it in, getting after a few applications a rapidly hardening surface. This plan might with care be followed in filling any cavities. The color is about that of clean, fractured steel or iron.

As I found myself using considerable quantities of amalgam I began to speculate on the possible effects of mercury on the system as mercury on its salts and of mercury in an amalgam, and to study the theories, experiments and statistics on this subject. Not finding anything that settles the matter one way or another in my mind, I commenced some experiments with a view to determining the amount of evaporation of mercury from amalgams and from mercury at ordinary temperatures. As an extreme I made my tests at a scalding heat, 150°, so as to have a temperature as high as an amalgam filling is ever subjected to in the mouth. I used an incubator such as is used for growing micro-organisms, so as to be able to keep a uniform temperature. In this I kept for twenty days at 150°F. a large mass of amalgam that had set with an excess of mercury and an ounce of mercury both of which had been carefully weighed with delicate scales. After twenty days it was found that neither the amalgam or the mercury had decreased a preceptible fraction of a grain in weight.

These results led me to think that the popular belief that mercury is volatile at ordinary temperature is a good deal of a delusion. The chemical action upon mercury in the mouth is another question, but it has always seemed to me that that was of minor importance to the question of evaporation. I think that it is plain enough to a dentist that the chemical action upon mercury in the mouth is practically nil, for with chemical action there is either wasting of material acted upon or the formation of insoluble compounds upon its surface which prevents further action. The latter action we often see but the former I think never, and the insoluble compound formed upon the surface is in all cases a compound with metals other than the mercury.

A test for evaporation that has been employed quite generally

is the ammonia nitrate of silver test. This test was used by Dr. Talbot in his experiments, and was shown before this society in 1884 by Dr. Taggert. In employing this test religiously I have not been able to arrive at results that I consider at all conclusive, for in making them with all possible care, excluding daylight, etc., the silver is reduced as thoroughly without the presence of mercury as with. Some of these experiments I made with the co-operation of Dr. Clifford Mitchell, and I have this gentleman as my authority in saying that the test *as it has been given to us* is a fallacy.

REPORT OF THE SUPERVISOR OF CLINICS.

MR. PRESIDENT:—Your Committee on Clinics offers the following report:

WEDNESDAY A. M.

Dr. D. B. Freeman, Chicago, filled cavities in the mesial and occluding surfaces of the second left inferior molar, and the distal and occluding surfaces of the first left inferior molar, for Dr. B. D. Wikoff, Chicago, with S. S. White's untrimmed, corrugated No. 4 gold foil, making his own pellets, and demonstrating his method of making and using tin matrices.

Dr. J. W. Cormany, of Mt. Carroll, filled for Dr. J. A. Lumpkin, of Mattoon, a mesial right superior central cavity, using the electric mallet and Pack's crystal foil cylinders, semi-cohesive.

Dr. J. Austin Dunn, of Chicago, operated for Dr. S. J. Paschall, of Fulton, Ky., treating a case of chronic alveolar abscess with fistulous opening, of eight years standing, in the first left superior bicuspid. The root canal was first cleansed. Peroxide of hydrogen was then pumped through the root foramen and fistulous tract, by means of the Dunn syringe, which is well adapted for this and similar cases.

Dr. K. B. Davis, of Springfield, filled for Mr. J. G. Pfaff, of Alton, Ill., a compound cavity in the second left superior bicuspid, esial and masticating surfaces, using William's cylinders, unannealed at the cervical margin, finishing with No. 60 foil annealed.

Dr. C. A. Kitchen, of Rockford, Ill., inserted for Dr. Chambers, of Fairfield, a compound filling, mesial and occluding, in the second left inferior molar.

A thin layer of tin was used at the cervix, upon this for a part of the filling soft gold, and the operation completed with William's cylinders, annealed.

Dr. C. P. Pruyn, of Chicago, used cocaine in several cases of

extraction of teeth, with comparative immunity from pain, although some of the cases were apparently very unfavorable to its successful use.

The clinical results were all that could be desired from a local anæsthetic.

THURSDAY A. M.

Dr. T. W. Brophy, of Chicago, inserted for J. G. Pfaff, of Alton, Ill., a compound filling, distal and occluding, in the right superior second bicuspid.

Tin and gold pellets were used at the cervical margin; soft gold for a part of the filling, and the operation completed with heavy foil, No. 60, annealed. He used his continuous band matrix.

Dr. E. D. Swain, of Chicago, filled for Dr. J. Frank Marriner, of Ottawa, two cavities in the right superior cuspid, mesial and occluding surfaces, united in one filling, with William's cylinders, annealed, for the whole of the operation.

Dr. Chas. P. Pruyn, of Chicago, used cocaine in several cases of painless extraction, with satisfactory results. In the last case he operated upon, the toxical effects of the remedy were beautifully shown to a limited extent, and gave him the opportunity of using some of the antidotes of this powerful drug. The physical condition of the patient were such as led him to expect the poisonous properties of cocaine to be manifested.

Dr. J. G. Reid, of Chicago, inserted a filling for Mr. Stewart, of Baltimore, in the right superior first molar, mesial and occluding surfaces.

Tin and gold rolled together were used at the cervix, and the operation completed with semi-cohesive gold, annealed.

Dr. J. J. R. Patrick, of Belleville, constructed and placed in position for Mr. Quinn, of Cairo, a gold crown upon the root of a first right inferior bicuspid, demonstrating his own method of stamping plate gold, to the natural form of the cusps. Other special features of the operation were original in design and manipulation.

Dr. A. W. Harlan commenced treatment for Mr. Frank Cusick, of Chicago—case of chronic pyorrhea alveolaris. Deep pockets from which pus exuded were found around many of the lower teeth.

Calcareous deposits were first removed as thoroughly as possible at one sitting, the pockets were cleansed with peroxide of hydrogen and further treatment given with the following:

Bi-chloride Mercury	2 grs.
Tartaric Acid	10 grs.
Distilled Water	4 oz.

using the hypodermic syringe.

He also treated for Dr. E. M. Robbins, of Carthage, a case of chronic pyorrhea of the left superior lateral incisor; first removing all deposits, then injecting peroxide of hydrogen and afterward a ten per cent. solution of resorcin; the latter remedy being indicated in this case because of impaired circulation in the tissues.

Dr. W. N. Morrison, of St. Louis, replanted for a young lady the first left inferior molar, after having cleansed the pulp chamber and canals, filled them with chloro-percha and gutta percha cones and the cavity of decay with amalgam.

Dr. T. L. Gilmer, of Quincy, made and adjusted a gold and platinum crown upon the root of a left lower first bicuspid for Mr. Quinn, of Cairo, demonstrating his method of making and mounting a telescopic platinum and gold crown.

Dr. J. Austin Dunn, of Chicago, treated a case of abscess with two fistulous openings originating in the first superior right bicuspid, for Dr. W. H. Chilson, of Appleton, Wis.

Peroxide of hydrogen succeeded by eugenol was pumped through the fistulous tract.

The warm air cavity injector, made by Dr. Parsons, of Kansas, was used for drying the canals.

The roots were filled with chloro-percha and gutta percha cones.

The tooth filled for Dr. A. B. Clark, by Dr. Pruyn, at Rock Island, in 1881; also one filled for Dr. Sawyer, of Jacksonville, by Dr. Tibbitts, at Peoria, in 1885, were in good condition. The results of any other former operations are unknown.

Respectfully submitted.

W. P. Richards, *Supervisor.*
C. P. Pruyn,
J. J. Jennette, *Assistants.*

DISCUSSION OF DR. AMES' PAPER AND REPORT OF COMMITTEE ON CLINICS.

OPENED BY DR. TAYLOR.

Dr. Taylor. (Opening the discussion.) Mr. President and Gentleman: As you have heard by the paper the Doctor has made quite a number of experiments. As I had not seen his paper before last evening, of course I have had no chance to verify any of his statements. I shall, therefore, confine my remarks to other questions connected with this subject. I believe that all metals, in fact all substances in their fluid state have a tendency to the globular form, and our amalgams have that tendency, because of the fluid mercury that is used in the formation of the alloy. I consider that an amalgam is truly an alloy, for it is a union of two or more metals. One point against amalgam as an ideal filling material is its color, another is its lack of edge strength. These limitations may be largely modified by methods of manipulation. The perfection of an amalgam filling depends more on this than on the materials used. And this is true of all materials that we use to fill teeth.

I shall have to oppose the view advanced by the essayist, that a lack of thorough mixture is an advantage to amalgam fillings of any kind. I think you cannot have the best results from any amalgam, without thorough trituration and working, a thorough amalgamation of the metals. Here arises again the question of the tendency of all metals, the nearer you come to the fluid state, to form globules. There is a tendency, if the pieces are not too large, to assume the globular form. When you press upon the mass the very thing you do not want occurs, namely, the mercury

comes to the outside. On the other hand if the mass be too dry, you have an imperfect result where you need the best, that is, at the cervical margins. The filling will lack in edge strength because there is not enough mercury to hold it in place.

I believe that it is no injury but a benefit to break up the crystallization, and you can do that by a thorough rubbing and working of the filling while it is becoming hard.

With reference to copper amalgam, I have used it more or less for five or six years. I find that it seems to keep its form perfectly. There does not seem to be any shrinkage. There has been one objection to it in my experience, and I have heard the same from others. Sometimes it has not hardened well and sometimes not at all. I have had one or two cases where after several days I could cut it out very readily with an excavator, and on rubbing it would give a crepitant sound, and I concluded it had been worked too dry. This objection can be overcome, as the essayist has said, by adding mercury. Copper amalgam is the only one I know of that is not particularly injured by having a surplus of mercury, a little more than you want to use for any other. But when it is properly mixed and remains undisturbed till set, the result is a filling of excellent surface.

In the use of copper amalgam we should not attempt to get rid of the excess of mercury by the use of tin. The tin will affect the filling so as to make a very rough and pitted surface; I would use copper amalgam in the teeth of young persons, and imperfectly organized teeth of adults. To my mind it is best used where the manipulation is most difficult, say in buccal or distal cavities in the second and third molars. As those of you know who have used it a little moisture does not destroy the usefulness of the filling, although it is always best if possible to have the cavity dry. The success of amalgam fillings largely depends on the preparation of cavities. The edge of the cavity should be nearly at right angles with the surface of the tooth. If you attempt to build on corners or beveled margins, the operations will fail from lack of edge strength.

Dr. Crouse. This report on clinics is somewhat new to me. I lose a great deal by staying out of this society for two years. It seems to me that there is little benefit to come from a simple state-

ment of what was done, without any comments, suggestions or criticisms.

Dr. Taylor. This report is open for discussion, and therefore the benefit to be derived will come in the ideas that are drawn out in the discussion.

Dr. Cushing. For Dr. Crouse's information I will read the standing resolution recently adopted in reference to this matter: "Resolved, that a supervisor of clinics shall be appointed annually by the president-elect to serve one year.

"The duties of such supervisor shall be to make all arrangements for the holding of clinics, to have charge of the clinic rooms, fixtures, etc., and to determine who may or may not operate, what operations shall be performed, etc., etc. He shall keep a record of all operations in a book provided for that purpose and shall report to the society annually at the second daily session after the holding of the clinic.

"His report shall contain as thorough a criticism of each operation as possible—setting forth all the steps he may have deemed incorrect or unwise, a statement of what he thought a better method and his reasons therefore—to the end that profitable and instructive discussion may follow. He shall also report as far as possible the condition of operations made at the clinics of previous years."

Dr. Crouse. I think the main duty has been left out this year and I would like to know if there is anybody else on that committee who can give us any criticism.

Dr. Richards. I would like to say just one thing in the way of explanation. This committee have had considerable to do; and among their great multiplicity of duties, which anyone who has been there can appreciate, the supervisor has not had a sufficient amount of time or opportunity to examine each and every operation so that he could criticise it candidly and impartially. If members who have stood by particular operations all the way through have noted what they might deem errors, they are in a better position to criticise than the members of the committee.

Dr. Reid. I put in a filling this morning. It was examined only once, and a defect pointed out by the supervisor. No other member of the committee saw the operation.

Dr. Pruyn. As an assistant to Dr. Richards I would like to say a word. This question of criticism of the clinics is one that we talked of considerably. We read and understood the resolution which Dr. Cushing has just referred to. Now we will try and show you some of the unpleasant features of the position we occupy. We have tried hard to make the clinics a success. We commenced many months ago writing to a large number of operators—three or four times the number that have operated during this meeting. We found it difficult to get men to come here and operate outside of Chicago. (Laughter.) We have tried to have as few from Chicago as possible. We wished the state at large to be represented as far as possible. Now, after they have consented to come, it seems to me it would be a little out of good taste to severely criticise their work. That is a duty which I think ought to be performed by the other members of this society. For the committee to do it would be, I think, positively discourteous.

Dr. Harlan. In view of what has been stated by the supervisor and his assistant, I think that the society ought to appoint a committee to watch the operation of the clinics and let the committee make the criticisms, letting the supervisor and assistant provide the operations, conveniences, etc. If we do not have a just and fair criticism of the operations and an exposure of any fallacious methods, practically the report will be of no value. I saw some operations yesterday and I saw some things to criticise, but that is not now a part of my duty, for the supervisor has not gone into the criticism of any operations and that is not before the house.

Dr. Crouse. It looks as though instead of the operators the committee is being criticised. While this matter is in order I wish not so much to criticise as to throw out an inquiry whether the injection of cocaine for the painless extraction of teeth to the extent stated in the report, is a safe practice; whether it is a practice to advocate in the presence of young practitioners? Is there not a frequent danger of what we have seen in one patient here, namely, the refusal of the system to rally from the action of the medicine? I do not think I shall be encouraged in the use of it from what I have seen here.

Dr Noyes. It occurs to me in the line following the remarks

by Dr. Harlan, that we might instruct our supervisor of clinics and his assistants to provide each operator with an assistant, whose duty it shall be to stand by through the entire operation and criticise it for the society afterward. In that way there would be a critic for each clinician chosen, not by the operator; but by the clinic committee. This would make a *definite* provision for a *definite* criticism, and would not be open to the objection that the critic would have only momentary observations of the different operations. The reasons why the supervisor of clinics should not criticise the operations are exceedingly strong, as stated this afternoon, both on the ground of the relations in which the operators stand to the committee, and the lack of opportunity to view the operations critically.

Dr. Koch. I fear we will not have members enough in the society to perform all the various duties that these numerous suggestions call for. It seems to me that the supervisor of the committee is hyper-sensitive. I do not see that anybody who accepts an invitation from this committee, knowing the rules under which he accepts it as laid down in the by-laws, could possibly blame the committee for any just criticism. I apprehend we are not here for the purpose of flattering each other, but for the purpose of learning, and if the criticism of an operation will accomplish an object which the discussion of a subject could not accomplish, we ought to discuss it without ill-feeling as we do when some one on the floor disagrees with us as to a statement made. Instead of more functionaries to be appointed for the next clinic, I would suggest that the superintendents themselves refrain from operating, and that they have so many operations going on at one time as they can supervise in accordance with the standing resolution.

Dr. Sitherwood. It does seem to me that we revise the constitution of this society often enough, and the duties of the various officers are so plain that they certainly ought to be able to perform them.

I am going to say a word about matrices. It seems to me sometimes that the profession has gone wild on this subject. Almost every operator at the clinics used a matrix, many of them for cavities that might have been prepared and filled by an ordinarily rapid operator while he would be applying the matrix. Why

use a thing you can get along without with much greater ease to yourself and your patient? Dr. Patrick shows us some instruments for making crowns. I timed him to-day and he was an hour and half making and putting on a crown, showing all his things to the observers, and passing out his work for inspection. I judge that he could easily have done the work in an hour. That looks like business.

One thing more. I should dislike very much to have it go abroad that so learned a body as the Illinois State Dental Society is advocating the injection of cocaine for the extraction of teeth, when it is a well known fact that some of the best physicians in the land sleep in their graves as the result of the ccoaine habit, and when it is well known that its toxic effects are most dangerous. No, sir. We have better things than that. Let us use instruments, properly made, for the extraction of these roots without the use of coc aine.

Dr. Swain. In regard to the criticisms on the committee, the supervisor of clinics, etc., I think it can all be stated in one word, timidity. It is not very long since we had a model report of a clinic from the supervisor. It was a little harsh; perhaps it was not put in the best of English; but we had it, and knew what it meant.

Dr. Ottofy. I think the clinics generally, yesterday and this morning, were excellent. I was well pleased with them; while hoping for more criticism by the committee, it has not been forthcoming, hence I presume we can make our own. I was surprised at the way in which Dr. Morrison performed the operation of replantation. The tooth had been extracted and laid on the table. The outer border of the alveolar plate was badly lacerated. It was suggested that the tooth might be filled and put back. Dr. Morrison picked up the tooth, not touching the root, and after it had been decided to replant he immediately wrapped it in a piece of paper, filled the root with gutta percha and the cavity with copper amalgam. Then he scraped out the cavity of extraction slightly with a lance, removing the blood-clot, and without washing the tooth or doing anything else with it, it was put back. The Doctor says he has frequently performed these operations that way. I question very much the propriety of that kind of work, and I

would like to have him explain to this society his reasons for not applying some germicide or antiseptic.

I was much interested in the cocaine clinic. Having been anxious for a local anæsthic, I have used it often and with such poor results that I have quite abandoned it. I think in all operations that I watched, there was not a particle of diminution of pain as the result of the injection of cocaine. Of course we have cases where the persons claim the operation does not hurt much, but we find the same thing when cocaine is not used: experience and observation strengthen the belief that it is almost a total failure.

Dr. Greene. I want to say a little in answer to what Dr. Swain said in regard to criticism of operations. Two years ago we had a very sharp criticism and last year it was a very difficult thing to get anybody to operate. There was no criticism last year and this year operators were obtained without much difficulty.

Dr. Morrison. Mr. President and Gentlemen: I have but a few words to say in explanation of my operation. I want it distinctly understood that I have a fear of micro-organisms, vegetable or animal; but my fear is not so great as Dr. Ottofy's. For years I have been very careful with regard to the air I breathe, the food I eat and the water I drink. I am glad the matter of the operation has been mentioned. I do not believe in the use of some of the very powerful remedies that have been used in such cases. I use them very carefully and to a limited degree. I have experimented in both ways and had as good results in replanting teeth before the use of medicaments as since. Therefore I felt perfectly justified in performing the operation that I did to-day. From my own knowledge of such cases, I have no fear. It is simply a surgical operation. If I were called upon to treat a flesh wound, made with a nail or some pointed instrument—I should not mop it out with some chemical and an old sponge before bringing the edges together. I would first bring the parts into as nearly their normal position as possible, allowing the serum of the blood to act as the cement. Having brought the parts into opposition, I would give them rest without the irritation of any chemical on the face of the earth. This case was not a favorable one on which to operate. At first I thought it was, but it seems that in the extraction the external plate had been considerably fractured. That I discovered

only after the tooth had been replaced in the socket. I merely broke up and took out the clotted blood, allowing little pieces of the gum still to adhere to the cervical portions of the tooth. I trimmed the points of one of the roots a little, these being closer at their points than above. In inserting the tooth again, it caught against the septum or some other wall, and would not go down. I used all the force I could with my thumb on the crown and it would not go to its place. I had to take a pair of forceps and rotate the tooth a little, and then with the pressure of the thumb it gradually went to its place. But the amalgam filling, which had not properly hardened was crushed out. Of course the tooth ought not to have been inserted until the amalgam was solid. That this tooth will be, other things equally favorable, as free from soreness, and the ultimate result as good as if it had been thoroughly dosed with per-oxide of hydrogen or bi-chloride of mercury, I do not hesitate to affirm. I did not have any remedies with me, but I doubt very much whether I would have used them if there had been a table full at hand.

With regard to the hypodermic injection of cocaine, I am not in favor of its general use. If any unfortunate results follow this case of replantation, I would attribute it as much to the use of cocaine as to the lack of the bi-chloride. I believe that when the tissues are injected with cocaine, repair does not occur as rapidly or as kindly as when it is not used.

Dr. C. N. Johnson. Dr. Ottofy stated last night in regard to filling with tin and gold, that it was not advisable to fill small fissure cavities in molars or bicuspids with that material, from the fact that gold could be used to better advantage. There is one exception that recurs to me where I believe it good practice to use tin and gold in these small fissure cavities, that is in the teeth of children. I think it certainly can here be inserted easier than gold. In fact it can be used almost as readily as amalgam. It is seldom necessary in these cases to apply the rubber dam, where if you insert gold it would be.

Dr. Ottofy mentioned also in regard to pulpless teeth that vent holes should not be drilled. It would seem that such practice should hardly need further condemnation; but it does need it because some are still doing it.

With reference to matrices, Dr. Sitherwood to-day criticised their use from the fact that it took so much time to apply them. I wonder what kind of matrices he has been using. The forms I have used can be applied almost in a moment. I seldom use a broad band matrix in the anterior cavity of a molar or bicuspid. I use them in posterior cavities. The criticism has been made that they hide the cavities. The broad bands do to a certain extent hide the margins of anterior cavities, but in posterior cavities I do not see that they do at all.

In anterior cavities I have used narrow matrices made by breaking a watch-spring into pieces half an inch long. They have the proper curve, and by grinding one edge convex will slip down between the teeth and cover the cervical portion of the cavity even if it extends below the gum. They are held in place by a wedge dipped in Sandaroc varnish. Only the cervical third of the cavity is covered and there is no obstruction to the vision. The object is to form a pocket in which to start the filling without the necessity of drilling grooves or pits for this purpose. They are certainly great aids.

Dr. Ottofy advocates burrs and revolving instruments for cutting dentine in preference to excavators. I want to emphasize that point. A great many of the older members have advocated to me the use of excavators in preference to burrs. If I have dentine to cut I can do it better and more quickly and less disturbance to my patient with a fine, sharp burr, revolving rapidly with the hand piece firmly held and applied to the exact place, cutting rapidly and taking the instrument away when the work is done. (Dr. Johnson illustrated his remarks on the board.)

Dr. Crouse. I would like to ask Dr. Johnson if he would leave an approximal cavity as he has represented with that circular shape at the bottom; and if he expects his matrix to answer all the purposes of retaining pits or squares, and if he would expect to start his filling there without trouble.

Dr. Johnson. That diagram is merely meant to outline the margin of the cavity. It has nothing to do with the shape of the cavity inside. The bottom should be square.

Dr. Taylor. I would like to inquire if any of the gentlemen

have used Steyer's gold for starting such fillings? It is plastic and can be burnished right down into these places. You do not need a serrated but a burnishing instrument, using no heat at all.

Dr. Crouse. I agree with the remark of some one that the subject of the matrix is attracting a good deal of attention. If you have shaped the cavity as you ought all the way along, you have allowed for anchorage at the cervical margin. You want no retaining pits, and but the slightest grooves if any. I would just as soon have the cavity square, and I do not want any matrix. I put in a cylinder of gold on one side, and with an instrument hold it there if necessary, then another opposite and a third if need be to wedge both and hold them. As I have said before the mistake is often made in starting the first piece of gold, that it rolls up and makes a marble so it will not stay in place.

Dr. Black. How about the walls of the cavity while one is making a marble of the gold?

Dr. Crouse. The walls of the cavity are being jammed to pieces, when you are using the mallet, or even where there is a good deal of pressure. We should not condense the walls of the cavity, but the gold. (Applause.) Don't stop and drill a little pit simply to put gold into it. While you are doing that you might have the cavity one-third filled. Of course there are some things which it is necessary to do; but don't consume your time, *don't annoy your patients with needless work.* I do not like to see a ligature tied around each tooth high up, there is danger of exciting a periosteal inflammation in many cases sufficient to condemn the operation. I have tried the matrix, and I do not believe in it. In contouring I want to get right up on the margin, take a plugger and work the gold up and tamp it home. I do not want a matrix. It is only in the way after you get beyond the margin. To-day I looked at the operations and said, "Well, is there a mania for tin and gold?" When a man gets through with a filling of this kind it looks like a tin filling. It is not half as pretty as gold. It takes just as long to put it in. (A member, Longer.) Yes, longer if anything. Some one said here last night that he would not put tin and gold into fissures in molars and bicuspids. I should say that the force of mastication would force the tin out of those fissures. I should not use it there except in the case of a small child

—a small child for example with a six year molar to be filled where you do not wish to put on the rubber dam, and simply to preserve the tooth till he is old enough for something more permanent. The gentleman said he would use tin and gold because you could put them in without the dam. You can use gold just as well if you operate in the same way. No one advocates, I presume, that it would be a good thing to try to make a filling under water. I am not advocating it, but it can be done.

As I looked at the operations to-day and went back in my mind to eighteen years ago, I said to myself, "There are many more good operators in the state of Illinois now then there were eighteen years ago." There is no reason why we should not have plenty of clinical operators who are not afraid to be criticised.

Dr. Gilmer. Probably Dr. Pruyn is waiting for some opportunity to answer Dr. Ottofy, and it seems to me a good opportunity now, and I suppose there will be no other time after this session.

Dr. Pruyn. Mr. President and Gentlemen of the Convention: The uses of cocoaine have been so varied and it has been used so much all over the civilized world, that it seemed as though it would be a good thing if we could see a few operations performed under its influence with some favorable and some unfavorable cases. To Dr. Ottofy I will say that if he would take the statements of the patients themselves, if he noticed the instruments used and the operations performed, it would seem to me that he must acknowledge there had been considerable immunity from pain as a result of the use of cocoaine. If the testimony of the patients is worth anything, and he saw the cutting that was done, as well as the exhaustion, he certainly must admit that the pain was mitigated.

Dr. Ottofy. I referred to the extraction. I understand you cut the gums.

Dr. Pruyn. I will say further that for the extractions it worked well in most of the cases. In the case of the little girl there seemed to be little if any effect at all upon the extraction. She was badly frightened and the operation was a painful one. The outer plate of the alveolus was fractured necessarily in removing the tooth.

I was glad we had an unfavorable case at the close, for fear that some one who had seen the more favorable cases would say, "Why, that seems perfectly easy and any one can go on and use cocoaine with perfect freedom." I saw the lady when she came in, had a talk with her, and made an examination of the heart and lungs and found out about her general physical condition. I saw she was not the patient for an anæsthetic. I should positively refuse in my private practice to give such a patient anything unless it should be whisky. I said, "Here we have a marked case where we shall probably see the unfavorable effects of the drug. Here we can show the gentlemen the poisonous effects of this remedy. Before I commenced to operate I told quite a number of gentlemen that here was a case where I expected trouble, owing to the condition of the patient, general anæmia, etc. She was a woman who had been under severe mental strain. Only a short time since, about six months ago she was shot here in town by her husband, a maniac. That was the reason she lost her front teeth. The ball came out of the side of the face. Her husband is now in the insane asylum. All of these things conspired together to make this an unfavorable case. She is a woman who faints very readily. I said "We will use cocoaine and get the toxicological effects." Well, we got them considerably; not as marked as in cases of complete collapse, because in this case we got the respirations shortened and quickened, and we had the circulation quickened as well. If we had gone on and got the further effects we would have found just the opposite condition — a complete letting down. This the remedies we used prevented.

You will find this remedy being used more and more every day. Druggists will tell you so all over the land. I would like to hear from Dr. Sitherwood the names of some of those physicians who are slumbering in their graves from the use of cocoaine. I have as I remember the record of only one, though there may be others. I think that was a case where a very large amount had been injected for hemorrhoids. There is no doubt that this is a remedy which is going to be used in the future. It is very powerful and as I have said I am glad we had such a case to show its unfavorable as well as unpleasant effects. I am using it in my practice with very good results, and some time I shall bring to your

notice a record, kept fully and completely, of a very large number of cases, showing all the conditions of the patient, the amount used and where injected, the operations performed, and the effect of the drug on the respiration, circulation and nervous condition in each case. To cast this new remedy aside would be a foolish thing. It is one that must be used with great care, as are other powerful remedies, arsenic, strychnine, etc., all of which are recognized as having fields of usefulness. (Applause.) They must be used intelligently. There is no drug universally reliable and satisfactory, and with our limited knowledge of this one I should advise very great care in its use, and not to grow wild over it from a few favorable cases, nor to condemn it from a few unfavorable symptoms, but carefully study its effects on both human and animal life.

Dr. Sitherwood. I referred to the cocoaine habit among physicians, which I suppose is well known to those who read the journals. It is well known that many physicians have formed the cocoaine habit, for the purpose of getting the toxic effects of the drug, and it has caused their death. I have used cocoaine with the hypodermic syringe, as was done here to-day, and I had toxic effects from it every time, from which I took warning. Having administered chloroform frequently I regard cocoaine quite as unsafe.

Dr. A. W. Freeman. In regard to the use of cocoaine I fear that in some cases we see only its temporary effects. At the American Medical Congress last year one of our own most worthy members said that he should hesitate very seriously to use it in the vicinity of the eye or the fifth pair of nerves. He cited cases where it had been used and the effects lasted for weeks, sometimes months afterwards, almost paralyzing some of the nerves. "Therefore," said he, "I should hesitate to use it in cases of extraction or in any minor surgery about the mouth." That man was Dr. Atkinson, who is about as progressive as anybody, and if he takes this view I think we should be careful. I have often used crystals of menthol, alcohol and a little chloroform, around the tooth I was going to extract, making two or three applications, warming up the gum and taking out the tooth. Some patients have said there was no pain. There is nothing disagreeable about the remedies except that occasionally the vapor of the mixture produces a little uncomfortable sensation at the throat.

In regard to the fillings Dr. Crouse speaks of, he probably forgets that when we were younger some of us did not make retaining pits, and rarely do we use them to-day. He speaks very truth fully when he says we often condense the gold too much. Let the first pieces be gently pressed to the opposing walls of the cavity—if it is an approximal bicuspid or molar cavity—between these mat- or oval pieces put one or two round pellets, large enough to wedges between the other pieces—carry down the centre with a rather broad-faced, hand-pressed plugger, and hold firmly until you condense the side pieces with another instrument. Put in another similar layer if you have not enough gold in the first to prevent the liability of fracture of the floor and corner wall borders before you mallet. Don't be afraid of your gold; let it extend well over the borders. The round pellets spread in all directions.

Dr. Moody. I am a country dentist and I want to speak a word in behalf of country dentists. Dr. Crouse has spoken about tin and gold in rather a slighting manner. There are probably many dentists in this state and country to-day to whom these reports will go out who may say each to himself, "It is utterly impossible to pack gold into every tooth that comes to me; I cannot get the price that will repay me for the work and time and for the part of myself that I pound into it." They become discouraged and in consequence go back to the use of amalgam. This applies not alone to the country dentists but to many of our city dentists. I do not want to lower the standard, but many of us are absolutely compelled to work at prices that are unsatisfactory.

I feel that it would be criminal to ask a girl working for three dollars or three dollars and fifty cents a week, ten or twenty dollars for a filling, even provided it would stay for twenty years. In regard to tin and gold, I can show a filling that has been in twenty years, and it is doing good service. A tin and gold filling properly put in, will, in the crown of a tooth, last almost as well as gold. Where you contour around the corners it has not that resisting power that is necessary for absolute perfection. Its color is an objection to some extent. I do not say that with tin and gold as perfect work can be done as with gold, but I say under some circumstances it is better for my own health and better for my patient, taking conditions as I find them, that I should use some other material than gold.

Dr. Newkirk. There have been some points brought out in this discussion and in the papers read that seem to me to demand particular attention. I think that I can speak both for the city and the country dentists. Not very long ago I was a country dentist and I am familiar with the experiences of both. There is a good deal of force in what Dr. Moody has just said. The practice of the man in the city who can select his patients and charge what he pleases in many cases, is very different from that of a majority of those present, from either city or country. These differences must not be lost sight of. I wish to say a word for amalgam, and I think it is in order, for we have had a paper on that special subject. It is not perhaps so much the kind of amalgam that is used as the way we use it, that needs consideration. In this very class of cases of which Dr. Moody has spoken, there is an important place for copper or other good amalgams; but much depends on the manner of their use. When an amalgam filling is inserted it should remain absolutely undisturbed until hard. The least disturbance of the mass impairs its value. How are we going to avoid positively such disturbance in a great many cases, where the fillings are large? The filling must be held firmly in its place till the amalgam has set. How can we do this without the use of a matrix? I sometimes use the matrix of Dr. Brophy, or some other, where it seems to be adapted for the purpose, but more usually I make a matrix for the case in hand, which is very easily done. I have a piece of copper rolled out thin, ready to cut up into strips of suitable width and form: a pair of square nosed pliers may be made to pinch the ends together, drawing the band very closely around the tooth. Have soft solder cut into small bits, ready for use—(I am using at present what is known as West's solder;) touch the point of union with muriate of zinc, hold the bands over the lamp an instant, and you have a matrix made about as quickly as I can describe it, that fits accurately. This was brought out I think by Dr. Matteson, in a paper read before the Chicago society. Dr. Herbst also uses this method. This matrix, to begin with, is of great assistance in packing the amalgam if comparatively dry. By a careful adaptation of instruments it may be thoroughly packed about the edges, and without an excess of mercury. Then leave the matrix on till the amalgam sets. The filling may be contoured

by crowding the upper part of the matrix out toward the adjoining tooth.

DR. CROUSE. Is the amalgam better for being so dry?

DR. NEWKIRK. Yes. If it is not quite dry, you are almost certain to get an excess of mercury, *and just where you don't want it*, as has been remarked to-day, *at the margins*. An amalgam filling should be thoroughly consolidated, and you want it to stay just where you put it. There should be no possibility of its being disturbed; and this you may insure by leaving the matrix on the tooth. Then when your patient comes back—and at least one day should elapse—you can finish it just as you would gold. You can give it a good polish, and have an operation you need not be ashamed of—one equally serviceable in many cases with the best gold filling.

DR. CROUSE. About how long would it take you to make such a filling as you speak of, and condense it as you would gold?

DR. NEWKIRK. I say an amalgam filling needs to be condensed thoroughly, made solid, just as a gold filling needs to be put in firmly. The same necessity exists for thorough packing; but it does not take much time, of course. The amalgam can be used in large masses, and with proper shaped instruments quickly condensed. The point is this, that the matrix permits this condensation, this certainty of results, and the finish. I hope those who are using amalgam extensively will try this method during the next year. It is highly satisfactory. Suppose you insert a large amalgam filling without supporting walls all around; when it returns for finishing you are not positive that it has not been disturbed, because it may have been so easily disturbed; and very frequently the failures that result with amalgam, are caused in this very way—by a very slight disturbance, it may be, of the mass.

I must say that at present I have a little doubt in my mind about the copper amalgam. Dr. Ottofy mentioned a case where the patient had suffered from a continuous metallic taste in the mouth; and I question whether the presence of copper in the mouth and the electric changes that take place to develop such a taste, are healthy conditions. Dr. Ottofy spoke also of putting copper amalgam fillings in under moisture. I do not see the necessity of putting in fillings under moisture one time in a thousand. After a

cavity is prepared, even in a child six years old, you can hold the dam on long enough to keep it dry for the insertion of an ordinary filling of cement or amalgam.

Dr. Crouse. You have got to get it on before you can hold it.

Dr. Newkirk. Yes, and it can be done.

Dr. Taylor. In the cases of these big buccal cavities and cervical cavities, how do you keep them absolutely dry when you cannot get the rubber dam above them?

Dr. Newkirk. I usually pass the rubber dam over the tooth, or several teeth, if necessary. I then take an instrument with which I can crowd the rubber above the edge of the cavity, and hold it there till the filling is done.

Dr. Sitherwood. I wish to briefly answer Dr. Pruyn. I referred to the cocoaine habit among physicians, which I suppose is well known to those who read the journals. It is well known that many physicians have formed the cocoaine habit, for the purpose of getting the toxic effects of the drug, and it has caused their death. I wish to say that I have used cocoaine by injection with the hypodermic syringe, in about the same measure as was done here to-day, and I had toxic effects from it every time, from which I took warning. Having administered chloroform frequently in my early medical practice, I regard cocoaine quite as unsafe.

Dr. Lawrence. I, too, am from a country town. I indorse what Dr. Crouse said to the effect that we are better operators than we were eighteen years ago. The query has come to my mind, why is it? Of course we in the country do not claim to keep up with the city, where it would be dangerous to accost a man with any other title than professor. (Laughter.) It seems to me that this progress is the result of an interchange of views and experiences in Dental Society work. I think we are indebted to Dr. Pruyn for the demonstrations given at the clinic. He is you may say a specialist with regard to cocaine. I heard him say this morning in the presence of the woman who submitted to the operation, that it would be very risky to use the drug in her case. He did it for our benefit, not that he wanted to take the risk, and I for one thank him for it. (Applause.) We have all learned something, and it seems to me he should be thanked rather than criti-

cized. Regarding clinics generally, I will say that I have been benefited more by seeing demonstrations made on the blackboard that the whole house could witness. It is very difficult to see very much of one of these clinical operations but we can all get instruction at the same time from a good blackboard demonstration.

There is another thing about criticizing an operator severely at these public clinics. He operates upon a patient who is not under his control, whom he has never seen and may never see again, and it is unfair to stake his reputation on one operation under such conditions. The committee state that as much as possible they select operators outside of Chicago. This is a mistake, we from the country towns want to get all the points we can when we come here, we wish to improve by coming in contact with such leading men as we find in Chicago and St. Louis, men who will give us advanced ideas, men who are not afraid to express or defend their views, the most progressive men of the age. It is to them we are largely indebted for the progress we have made in the past eighteen years, not only as operators but as general surgeons.

SOME MAIN POINTS TOUCHING THE CONSERVATIVE TREATMENT OF TEETH WHOSE PULPS ARE NEARLY OR QUITE EXPOSED.

J. D. MOODY, MENDOTA, ILL.

I was requested to make my paper "short and practical": therefore I will confine myself to the first half of my title, and only to one line of procedure in that, leaving to Dr. Johnston's paper the treatment of exposed pulps, which are, as a matter of fact, almost invariably under some degree of inflammation. Without entering too deeply into the pros and cons of the subject, I intend simply to give you my method of treating such cases, one which I have found to be eminently successful, and one which faithfully carried out by dentists generally would lead, I am persuaded, to equally happy results with them.

The conservative treatment of the teeth has, of course, some relation to the pulp — to save the tooth and at the same time save the pulp.

A very large percentage of the teeth with which we have to do are of faulty organization.

White, chalky teeth, friable enamel, disintegrated dentine, and a leathery mass occupying the bulk of the cavity, tell the story with which we are all so familiar. As a text from which I shall attempt to prove my position, I will suppose a cavity on the distal surface of a cuspid, bicuspid, or molar of this class. My experience has been that in immediate filling in such a case, metal is, to borrow a phrase, "incompatible with tooth substance"; in fact that it is the worst material with which the tooth can be filled, *at the first.* "Conservative treatment" again, means both the preservation of the pulp and not too great a sacrifice of tooth structure. In the case supposed, with a near exposure of the pulp, thermal

and mechanical reasons would preclude immediate filling with metal; and to these I would add another, that indefinite and so far undefined condition, which, for want of a better term we call "incompatability."

In some cases this supposed cavity could be filled and with the happiest results, by flowing oxyphosphate over the bottom and completing with tin and gold. But in most cases this method will not result in arresting decay for any length of time. The condition is one which will be recognized by all as of very frequent occurrence and accompanied by very frequent failures.

The factors in the case are a lowered vitality, frail tooth structure, micro-organisms, and a sensitive pulp. As to the first it is within our province as medical men to advise as to systematic treatment when needful; not necessarily to conduct that treatment, but to recognize its necessity and advise accordingly. As dentists, every effort should be made by us to get an understanding of the cause of frail tooth structure, the office and growth of micro-organisms, and the treatment of an inflamed pulp. This discussion is, however, outside the scope of my paper, and so, merely citing the fact, I will outline my plan of work in the "conservative treatment of teeth whose pulps are nearly exposed." In the case spoken of previously, if inflammation of a low degree should exist I would first subdue it by many of the well known remedies used for this purpose. The pulp is the life of the tooth, to preserve its integrity is the first aim of conservative treatment. This cannot be assured without some kind of a filling, non-irritant, moisture tight, a non-conductor, having compatability with tooth substance, and of at least some degree of permanency. These conditions only exist in the cements and gutta percha. In preparing the cavity, the first thing is to secure space enough in which to work satisfactorily. I value my eyesight, general health and my own convenience too highly to work in cramped surroundings. At this stage I apply the rubber dam. I could do without it frequently, but it gives one a sense of security that is all important to uniform success.

Then with proper instruments I shape the cavity externally so that when the fillings are inserted tooth wall will not touch tooth wall. Then cut away a great portion of the defective dentine leaving a portion over the pulp chamber, but being sure of having

clean margins. I next pack a line of gutta percha at the cervical margin; if this is below the gum line, bring the gutta percha at least to the top of this gum line. Trim off and fill cavity with oxyphosphate of zinc. After this is hardened trim and coat with chloro-percha or Sandarac varnish in order to keep dry until crystalization is thoroughly completed; or the rubber dam may be left upon the tooth first filled while the preparation of cavities in others is proceeded with.

By the use of gutta percha at the cervical margin you may absolutely prevent disintegration of the oxyphosphate at that vulnerable point; otherwise it will almost certainly occur. Cement fillings I would leave in from six months to two or more years. As a rule I leave them in as long as they remain in good condition. In some few cases I renew this from time to time as may be needed and so retain it in the tooth for years, but in general I replace with appropriate metal fillings at from one to two years.

My reasons for this process are as follows: Experience has taught me that in time the teeth become harder, resist decay and bear contact of metal fillings better—far better, than if these were inserted at time of first excavating. The pulp loses in a marked degree its sensitiveness to thermal changes, and by reason of a hardening of the overlying leathery mass, a deposit of secondary dentine, or a general recession of itself, will bear impact better than before. In a pulp so nearly exposed there may exist a low state of inflammation, (though as a rule I believe it is not the case), which needs but an existing cause such as malleting, to produce a fatal termination. Every country practitioner, at least, living among a people ignorant of the laws of health, will have a preponderence of just such cavities as these. So much do I believe in this mode of treatment that I use it very extensively in my practice, and am glad to bring it to the notice of those who are similarly situated.

Oxyphosphate of zinc is not irritating to the pulp, except in rare cases. I mean, of course, only in a near exposure. In the American System of Dentistry, Vol. 2, page 252, Dr. Bennett says, "When any of the zinc plastics, particularly the oxychloride, is used in soft teeth, or near the pulp, the dentine surface of the cavity should always be varnished with mastic, etc., etc." In a dis-

cussion before the Chicago Dental Society, I find Dr. Ottofy is also on record as advising this varnishing process before the use of oxyphosphate. I have frequently seen the same statement elsewhere, but am not at this moment able to make quotations. The only object I can see in so doing is protection to the pulp. In the use of oxyphosphate the pulp does not need protection, and the use of varnish precludes the very thing for which I use the cement, namely, its therapeutical action upon both the pulp and the tooth substance. Of all the materials we have at present, I believe the oxyphosphate to be the best for the purpose indicated. It is tolerated by tooth structure and pulp tissue (if not in direct contact) better than any other material with which I am acquainted. I do not find it as dangerous to the vitality of the pulp as so many seem to think. Recollect I am talking about near exposures—I do not believe in capping, I undertake no forlorn hopes in a direction my experience has shown me to be full of pitfalls.

It is because I believe so strongly in this method and desire others to try it also, that I wish to compare notes with an article by Dr. W. D. Miller, of Berlin, published in the Independent Practitioner, for February, 1885.

Dr. Miller has placed himself on record there in this matter. It is possible he may have altered his views since that time. If so I have not seen it, and would be glad to be corrected. I select his article because, first, of the high authority from whence it came, and because it was one of only two articles I could find on this subject as published in the last five years. He gives it as the result of extended experiment. The lamentable lack of systematic indexing of society proceedings in our dental journals, with the single exception of the Dental Review, has prevented my hunting up everything on this subject. I do this with the hope that my statements may lead to further experiment and consequent good.

In the article in question, on page 60, he says, "The filling should always be examined a few days after insertion to determine whether it is properly hardened. * * *" I no more think of examining mine afterwards to see if it has become properly hardened, than I would a gold filling. *I know it is.* Again, on page 61, "* * * As a temporary filling its value is very questionable." As a temporary filling my experience has shown its value

to be *unquestionable.* Again, same page, "If we make with all due caution a filling of oxyphosphate * * * the chances are, that at a time by no means far off * * * we find a large cavity under the margin of the gum."

This would be the case were gutta percha not used at the cervical margin, but with its use it would never be so found. Again, same page, "* * * Secondary caries seem to progress with considerable rapidity because the antiseptic property of the material is almost zero. * * *" Used as I indicated, secondary caries will not progress "with considerable rapidity," in fact does not at all until the oxyphosphate has been nearly all washed out. The margins of the cavity are thoroughly protected. In all my experience with it I have never seen decay progress under oxyphosphate fillings, even where extensive deposits of leathery substance have been left in the bottom of the cavity. Again, on page 61, "Especially where it is necessary, for some cause or other, to leave decayed or softened dentine in the cavity, oxyphosphate should be avoided, as the smallest amount of moisture in the dentine prevents the thorough adaptation of the cement to the tooth structure." I do this every day and have the most perfect adaptation.

On page 62, "We need, at present, in a cement, a material which may be used in very soft, porous teeth, sometimes over partially decalcified moist dentine, and which will not only stop the decomposition of the softened dentine under the filling, but will also effectually shut out external agents, and at the same time, if possible, incite the underlying dentine to a recalcification. In all these points the oxyphosphates are wanting, besides giving very inconstant results even in the most favorable cases." This quotation is misleading in almost every particular. I have found oxyphosphate to fill every requirement of which he here speaks, except it may be in that of recalcification. Of that I am yet in doubt. I have only to add in support of my position a few statistics gathered from my record of years. I have gone through my books and noted every case that has come under my observation during the past year, with the following results: 537 cases, and nearly all of the extreme character under consideration; 243 fillings had remained about one year, and were replaced with some form of metallic stopping. In 230 of the 243 cases the pulp was in good

condition. Five teeth contained dead pulps where I had not expected such a result, and eight had dead pulps where I had marked the record as doubtful. One hundred and ninety had been filled about two years and were then filled permanently. Of these, 179 were in good condition; 6 had dead pulps where not expected, and 5 had dead pulps where marked doubtful. In only one case do I find recorded a dead pulp under a gold filling which had replaced an oxyphosphate. Again I find 91 that have been in over two years, an average time of three and a half years each. Of these a large proportion have been replaced by metal fillings. I am very cautious in this work and very rarely cap a pulp, only when I have myself accidentally exposed it, and then only when systemic and other conditions are most favorable. I find recorded ten fillings which have been in on an average of four years, and two pulps which died in a little less than two years.

These statements of Dr. Miller's have also been incorporated into the American System of Dentistry. It may be that the foreign cements are not so good, but I am so placed as to see a great many of the German and French cement fillings and as a rule they seem equal to if not better than ours.

I believe the principal reason of Dr. Miller's failure in using oxyphosphate was in not using gutta percha at the cervical margin.

I am not claiming great permanency for oxyphosphate fillings, but I do claim that by its use these bad teeth become harder, the pulp is better protected and that the tooth is placed in better condition for the insertion of permanent fillings, and has more years of serviceability in it than when treated by any other means. In this, slovenly work will not do; it must be thoroughly and intelligently done.

WHAT SHALL WE DO WITH INFLAMED PULPS?

BY DR. JOHNSTON.

This question, like the one, "What shall we do with our daughters?" is one that constantly confronts us. Like Banquo's ghost, it will not down.

Every one knows how to treat an inflamed pulp, but the man who has had no failures in his practice, probably has no practice.

In the first place—inflammation of the dental pulp is like any other inflammatory action, in that it is attended with redness, swelling, heat and pain, is followed by the same sequelæ, and may terminate in the same manner—either by resolution or mortification.

In the second place—inflammation of the dental pulp is unlike most other inflammatory processes, because of its position in the center of the most unyielding substance in the body; its lack of absorbents for inflammatory products, and its liability to have its blood supply shut off by strangulation, when swelling occurs.

This latter seems to be the chief reason why the destruction of the pulp so often ensues—even after our best efforts to preserve it alive.

The brain is a mass of nervous matter confined in a bony case, and we know how fatal is "Inflammation of the Brain," yet the skull has several openings through which the membranes of the brain, or the cerebro-spinal fluid, may protrude and so relieve the pressure produced by the excess of blood.

A tooth has no such safety valve attachment.

A congested brain is often relieved by epistaxis.

A congested pulp has no such means of ready relief, and speedily becomes inflamed.

An inflamed pulp means toothache.

The causes of trouble will sometimes indicate the means to be used for relief.

A fungus growth is always to be removed before the pulp proper is treated.

A pulp stone may occasion so little trouble that gentle stimulation of the gum by a capsicum plaster will be sufficient to withdraw the blood from the part, and end the difficulty. But the capsicum plasters furnished us for the purpose are too strong.

If this fails, the soothing influence of tincture of Jamaica dogwood may produce the desired result, but usually in these cases destruction of the pulp is necessary.

Dr. Ingersoll has suggested a diluted tincture of capsicum, and I have used this in various strengths, saturating blotting-paper with it, after covering one side of the blotter with writing paper in order to protect the cheek.

The indication for the relief of an acutely inflamed pulp would seem to be to open into it with a properly disinfected instrument and relieve the tension by the abstraction of blood.

This is the surest and speediest way of relieving pain. The fundamental principle in the treatment of all inflammations is—"First remove the cause."

This is not *all* that is necessary.

If a pulp is nearly but not quite exposed, and becomes inflam ed by thermal changes or from pressure, we may fill that tooth with a protecting, non-irritating, non-conducting substance, but our troubles are not yet at an end. Active measures must be employed to save the life of the imprisoned pulp.

It seems a small thing for which to give medicines which will affect the general system, and yet a saline cathartic and a mustard pediluvium will often relieve and sometimes cure such cases.

The local application of aconite, aconite and iodine or a capsicum plaster to the gum over the tooth, may by determining the blood from the inflamed part, tend to produce resolution; or free scarification with a lancet may bring about the desired result.

In using iodine, the saturated alcoholic solution has given me

the best results, and when applying it, I give the tissues all that they will absorb.

The practice of dipping a large pledget of cotton into the tincture with a steel instrument and inserting it between the cheek and gum, leaving it there until the iodine has spread over the greater portion of that side of the mouth, is neither skillful nor humane.

If the cheek is drawn aside and the medicine applied with a little cotton rolled upon a match stick, the patient's cheek will be saved a needless blister—and iodine—not iodine of iron—will have been used.

Lanolin has been recommended as a vehicle for applying topical remedies, because of its penetrating properties.

It disappears rapidly when rubbed upon the skin, carrying the medicine with it.

One great difficulty with which we must contend is, that the suffering being so severe, the patient is often willing to sacrifice the tooth rather than endure the pain.

He demands instant relief.

"For there was never yet philosopher who could endure the toothache patiently."

If the means employed for the removal of the pain by aborting the inflammation, prove unsuccessful, there is but one alternative—to devitalize the pulp.

An inflamed pulp with an irritant poison applied directly to it, is an unpleasant companion for the patient to take home.

Chloroform, oil of cloves, creosote, eucalyptus, eugenol, in fact any one of the whole list of stimulating, warm-tasting, volatile drugs has power to quiet, for a time, the intense pain caused by the exposure of an inflamed pulp. The cavity may be syringed out with a warm solution of salt and alum to cleanse it and remove foreign substances.

In many instances this will allay the pain. Of course no dentist of the present day applies arsenic to a pulp which is aching. I did this once at night, and as the patient lived next door, I heard from her before morning. Since that time I insist upon applying arsenic in the morning.

If we had some agent which would quiet the pain and at the same time remove any exudation which might have taken place, we should then have the pulp in the best possible condition to receive the arsenic.

Having used trypsin very successfully as a solvent for diphtheretic and aphthous membranes, I have been moved to try its effect upon this class of cases. The results have not altogether met my expectations.

Trypsin will relieve the pain for a couple of hours, but it rapidly decomposes, and we have other agents which do fully as well, are more easily applied and do not cost $4.00 per ounce. Trypsin acts very slowly upon a live pulp.

If a slight exudation has taken place or a blood clot is present trypsin will digest it, but if left in the tooth more than seven or eight hours, it decomposes, and in turn causes pressure where we have tried to avoid it.

I have tried this remedy in a number of cases, but most of the results were negative, and did not justify further investigations in this direction.

If a continuous current of warm air be thrown upon a nearly exposed pulp, avoiding pain, the result will be to dry out the surface and relieve sensibility to a marked degree. The best instrument I have seen for this purpose is Dr. Call's pulp canal dryer, by which a current of air warmed to any degree may be directed to any point.

Dr. Black has pointed out the absence of general sensation in the dental pulp and its re-action simply to heat and cold.

If all our remedies are warmed before applying, we will save much suffering.

In congestion of the pulp there is a determination of blood to the part. Stasis of the blood soon ensues and the first stage of inflammation is ushered in.

The blood rushes in more rapidly than it can escape, and soon the current is stopped, both ways. If we can persuade the blood to leave this crowded neighborhood all will be well.

If not, the white blood corpuscles will work their way out of the vessels, and not having anything else to do, they will die.

This ends the case by suppuration.

For the purpose of diverting the blood from the part, stimulants are indicated, and almost all of our remedies for toothache are of this nature.

The stronger agents used for this purpose, nitric acid, carbolic acid, Robinson's Remedy and others, not only stimulate, but they coagulate the albumen at the surface of the exposure, and so form a protective covering over the pulp; defending it to a certain extent against thermal changes. At the present day the use of escharotics upon the pulp or in the pulp canals is not considered good practice.

Coagulated albumen is a foreign substance and has no place in a tooth.

When it is necessary to apply arsenic for the destruction of the pulp, we defeat our own plans if we use an escharotic beforehand.

The eschar formed is so dense that the devitalizing agent will penetrate it with difficulty if at all.

Many times, no doubt, it has been necessary to apply arsenic repeatedly, simply because it had not reached live pulp tissue.

The stimulant having been exhibited, the blood is driven out of the tooth and the pressure relieved. If the case is a simple one, and the patient young, black-haired and healthy, this may prove sufficient provided no further irritation be present. These are the cases in which pulp capping scores its greatest success.

The administration of quinine in the cases just described is helpful, more from its tonic effect upon the nervous system than through any direct action upon the blood.

In malarial districts, full tonic doses should be given.

The practice of introducing a permanent filling into a tooth, the pulp of which has been recently in an inflamed condition, is always hazardous, and under most circumstances to be avoided. If any trouble arises, it is but the work of an instant, with a warm instrument, to remove a gutta percha filling and relieve the pressure upon the imprisoned pulp; for even if no pressure existed when the tooth was filled, swelling has afterward occurred else there would be no trouble.

If nothing but the destruction of the pulp will suffice, how shall this be done?

After relieving the pain by whatsoever means, and making as free access to the pulp as possible, the blood clots, or coagula if present, should be removed in order to attain the best result.

The greatest success has attended my use of arsenic, 1 part; hydrochlorate of cocoaine, 4 parts; lanolin, 5 parts; allowing the application to remain twenty-four hours.

Ordinarily, an inflamed pulp will not readily yield to the soothing action of cocoaine, but when combined with lanolin the effect has sometimes been magical.

A short time ago, as an experiment, I applied this preparation to an aching molar in the mouth of a lad of fifteen, without first subduing the pain in the usual way, filled the cavity with gutta percha, and on the following day removed the pulp, absolutely without pain. The boy said he had experienced no pain after leaving the chair the day before.

In these cases the pulp comes out easily and entire.

An inflamed tooth is generally tender to the touch. The occlusion of the opposing tooth gives severe pain.

This may be relieved at once if the patient will hold a wooden toothpick between the teeth of the opposite side of his mouth.

In the vast majority of instances, if a pulp has passed the stage of congestion and entered the inflammatory state, the entire removal of the pulp is the surest and safest way out of the difficulty.

The capping of a pulp which has once been inflamed is of doubtful expedience. The second attack is quite sure to come and is harder to subdue.

Patients do not like failures, and are apt to have little patience with us if we fail, even though we have done our best.

With the delicate instruments at our command, and the antiseptics and disinfectants of modern times in constant use, the chances are very much in favor of the complete removal of the offending member. "Cut it off, why cumbereth it the ground!"

But whatever we do to subserve the best interests of the patient, we must be thorough, careful, painstaking and delicate in our manipulations. Our patients come to us for three reasons:—prudence, pride or pain, but the greatest of these is pain, and we should exert our utmost skill in its prevention and relief, for "by this craft we have our wealth."

DISCUSSIONS FOLLOWING THE READING OF DR. JOHNSTON'S AND DR. MOODY'S PAPERS.

Dr. Harlan. Mr. President: I am not one of those to shirk any responsibility which is thrust upon me. In opening the discussion on this question, I wish to say in the first place that the essayist has treated the subject in a manner that is befiting its importance. It deals, as I understand the title of the paper, not entirely with exposed pulps, but with inflamed pulps, and the question of what to do with an inflamed pulp is the one to which I shall confine myself in this discussion.

I can scarcely agree with the essayist, if I understand him correctly, in saying or leading to the inference that all inflamed pulps should be destroyed. There are certain inflamed pulps, especially in the teeth of the young, where every endeavor should be made to retain the vitality for a certain period. A good many pulps are inflamed in the first permanent molars at seven and eight years of age, and if we expect to retain those teeth it would be very bad practice indeed to destroy the pulps at that time. We have also inflamed pulps in central incisors before they have attained their full growth and development, and of those teeth I would also try to preserve the vitality as long as possible. With reference to the destruction of the pulps of teeth that are inflamed, I do not think that in all cases they should be destroyed even after the patient has arrived at adult life, as in the anterior portion of the mouth, particularly, the destruction of the pulp makes serious disfigurement. This is especially true in the mouths of women where the teeth are more exposed than those of men. I have very little hope of the permanency of pulp capping in teeth after adult life has been attained, when the pulp has ached for any considerable period of time, and when on puncturing it pus is found to exude from the opening. There are some cases in the mouths of persons whose

occupation takes them out of doors a great deal and who are very vigorous and strong, where it would be possible and probable that the pulps would live; but the necessity does not always exist for the retention of the pulp of the tooth after twenty-five or thirty years of age, because the tooth has then attained its full development, and, indeed, often prior to that age.

The teaching of the paper is good throughout with the exception of the cases that I have mentioned. Other exceptions may possibly occur to the gentlemen who have listened to it. The combination of arsenic, cocaine and lanolin, proposed by the author, is an excellent one, and I think the members will do well to try it. The essayist did not mention the value or efficiency of a blister as a counter-irritant — which should not be lost sight of. In his recommendation of the warming of remedies prior to their being placed in the tooth, I heartily concur. In those cases where we have decided that it is unadvisable to destroy a pulp that has been inflamed, it has been my practice, if the inflammation was of a recent beginning and not very pronounced, to use in the cavity such agents as would have a tendency, locally, to reduce the inflammation, to use counter-irritation and to administer remedies for the reduction of the blood pressure. Still the practice of introducing remedies into the system for that purpose in general is of little value on account of the location of the pulp of the tooth and of the unyielding walls of the pulp chamber and canal. I have found that it is a good practice, as has been recommended by the essayist, to puncture the pulp, not to thrust a large or clumsy instrument into it, but a very fine point, so that the blood pressure would be relieved locally and at once. After that has been done, the application of iodoform, of iodol or some of the essential oils in combination with either of these and the sealing of the cavity without pressure, is generally considered a safe practice and one that I have had much satisfaction with. I do not favor the application to an inflamed pulp after it has been punctured and dressed in the manner described and sealed for a week or longer, the still further application of remedies that will have the power of destroying a portion of the surface of the pulp. I believe that the least interference in that particular that we can give to the pulp the better will be the results and the condition for the final capping. I would not favor

any very immediate operative procedures in the way of capping after having reduced the inflammation and quieted the pulp. I would rather keep a temporary dressing in for a few weeks, if possible, before applying any capping material whatever. A great many failures in the treatment of inflamed pulps result, I have no doubt, from the too hasty use of capping materials, from the manner in which they are introduced, by causing pressure and other disturbances. If the gentlemen desire to save inflamed pulps in the teeth of very young persons, the plan of treatment indicated by the essayist and the plan that I have proposed, may possibly result in their salvation. (Applause.)

Dr. Crouse. Mr. President: I had hoped Dr. Harlan would review the other paper, too, that of Dr. Moody on the treatment of nearly or quite exposed pulps. From what the committee had written me, I supposed he would deal principally with the question of capping. I am not disappointed, however, in this, but rather in the experience he has had with the class of teeth described, and his treatment. I should prefer exactly the opposite treatment, because in the first place I have not much faith in the theory of the incompatibility of dentine to filling materials. That has always been too deep for me. I know from my own observation many times, that the dentine under metallic fillings, amalgam, tin, more perhaps than under gold, has grown hard. It is undoubtedly one of the provisions of nature to make an effort to restore, or, rather, to hinder the destruction of parts; and that is what the pulp of a tooth and the tubuli running out into the dentine are for. It is one of their missions to resist destructive action, and under favorable circumstances they to some extent prevent the rapid destruction of the dentine. I have in my mouth two cavities that have been open, one of them certainly for thirty years — since I was a boy; a bicuspid with a big cavity that has become entirely hard and polished in the bottom. It never has had any filling in it. There is a difference in patients in this respect. There are some in whose mouths the decay as you attempt to cut it is dense and hard. In others you will see the flaky mass that Dr. Moody speaks of, where decay goes on rapidly and where the flaky, cartilaginous portion of the tooth is left, with all the lime salts dissolved out, in which cases he recommends temporary fillings. Now, I do not object so much to

the temporary filling, as to the kind he advocates, and that brings us back once more to the question of materials. If there is any place that tin is indicated in preference to either of the cements, in my opinion, it would be in this class of cases. I think I should consider amalgam preferable to cements as a temporary stopping, to see if decay might be arrested. I would not defer the permanent filling on account of the supposed incompatibility of dentine, the filling material, so much as to know whether the labor necessary to make a perfect operation were likely to be rewarded with sufficient success to make it worth while. In the class of cases where the decay is going on so rapidly, my experience is that temporary fillings of oxyphosphate or oxychloride of zinc are *very* temporary, the most temporary possible.

The essayist has recommended the lining of the cervical margin with gutta percha. That is better than either of the zincs, and unless it were a place likely to be disturbed by chewing, I should much prefer the use of gutta percha all the way through to either of the preparations of zinc; and I think a good amalgam filling would be quite as likely to be productive of good results as either. Tin alone, in the shape of cylinders can be packed into a cavity of that kind in a very few minutes, almost as quickly as zinc, and, I think, would be preferable.

I have used carbolic acid in these cases as a remedy for sensitive dentine with so much success that I think it is the best application that can be applied over a pulp that is nearly or really quite exposed. I know of nothing that I have more faith in than a saturated solution of carbolic acid. If a pulp is exposed I want to coagulate the albumen over the point of exposure, to lessen the size of the pulp; and instead of the oxyphosphate I should use the oxychloride of zinc as a capping. Now, in speaking of that, I consider that I am touching upon the most delicate operation in dentistry, the capping of an exposed pulp with any kind of material. Whatever is used must be one that is used delicately, and I know of nothing better than the oxychloride of zinc, after you have formed a coagulum over the point of exposure. That has been my practice, with frequent variations, for eighteen years. The variations have come when I have been to one of these meetings, and having an unquestioning faith in the experience of our friends, I

have gone home to try what they recommended; then, after some failures, I have gone back to my old remedy and had comfort again.

I do not mean to claim that I have had no failures and no trouble, but that I have had less than with any other method I have tried. I am aware that a considerable per cent. of pulps that are capped die. Suppose they do. Out of that number quite a large per cent. will never give trouble nor the teeth show any discoloration. I have no doubt many such pulps are mummified. I have opened cavities and found the mummified remnant of the pulp shrunken up in the cavity and completely dried. If your patient is going to California on a trip around the world, take the pulp out if it is exposed, so that he will not run the risk of painful trouble where he cannot get help; but if he is to be with you, it is best to explain: "This may die, but the chance of saving it is better than the chance of losing it. The chance of no trouble is better than the chance of trouble." I have kept a record of all my cases for eighteen years, noting those where I think the pulp may probably die.

Dr. Stevens. You speak of a saturated solution of carbolic acid. What do you mean by that?

Dr Crouse. Ninety-five per cent.

Dr. Stevens Five per cent. is a saturated solution just as much as ninety-five per cent. There are only two clear solutions of carbolic acid, ninety-five per cent. and five per cent.

Dr. Crouse. I think a mistake is often made in capping pulps — I know I have made that mistake myself — in that the operator tries to use too small a cap to start with, just capping the portion of exposure instead of letting it go beyond so that it may be firm in its place.

Dr. Wassall. Mr. President. Years ago all dentists capped pulps with the oxychloride of zinc, with greater or less success. Later the oxyphosphate cement was introduced and it began to be employed for this purpose in preference, the general evidence being that they are more successful with it. Dr. Crouse is peculiarly successful in the use of oxychloride for capping pulps. He possibly has given the oxyphosphate as fair a trial as any one, but it

does not seem to be so successful in his experience. That is his misfortune, I think, for it does not seem possible to my mind that he can be so successful with the oxychloride as others are with the oxyphosphate, when the character of the two materials are considered.

I wish to speak of one phase of pulp disease, and in doing so I merely reflect what I have learned of Dr. Black. It is the first stage of inflammation, hyperæmia of the pulp or simple congestion. I speak of it because it occasionally forces itself on us in a very unpleasant way, and because it is rather difficult of diagnosis. It presents itself usually as an obscure pain, a pain of indefinite location except as to side of the face, extending up to the forehead usually, especially if it arises from an upper tooth — a neuralgic pain on the side of the head. You can look for the offending member on that same side of course. One case of hyperæmia of the pulp I have had quite recently will give you an idea of what I mean. The pain was on the side of the head, and in searching for the cause I looked along the upper teeth and found several large fillings. The fillings were all good and the pulps vital. By tapping along upon the teeth one was found to give a response of pain. It was just such a soreness as you would find in a tooth where there was an incipient alveolar abscess. Herein lies the difficulty in diagnosing these cases, in differentiating hyperæmia of the pulp from abscess. You cannot always depend upon the heat test to detect the condition. The heat test in a tooth where the pulp cavity is closed will often give you a response even when the pulp is dead. I have met such cases and accounted for the response by the fact that the expansion of the gases in the pulp-chamber by heat forced the gases through the apex causing pain which will sometimes be mistaken for pain from the living pulp. Then again, many sore teeth with living pulps will not be sensitive to heat. I have been misled into drilling into teeth expecting to find them dead because the pulps did not respond to the heat test, and behold I would find a living pulp. The pain from percussion of the tooth which contains a living pulp, that causes it to be mistaken for an abscessed tooth results simply from the transmission of the force to the sensitive pulp inside of the tooth. These are some of the difficulties of diagnosing cases of hyperæmia of the pulp.

Dr. Gilmer. As a counter-irritant instead of capsicum plasters I have used with satisfaction in the treatment of hyperæmic pulps, also in pericementitis, mustard plasters such as are found ready made for sale in the drug stores. They may be cut in squares of suitable size and given to the patient to apply.

In very many front teeth there is a lack of room, and we do not want to use a bulky capping. In these cases I have taken a small amount of phosphate and placed it on a piece of quill cut to the proper size, and applied it to the pulp. I am aware that quill capping is an old thing; but in combination with the phosphate have heard nothing of its use

Dr. Wassall spoke of testing the life of a tooth under treatment with heat. Did he use the cold test? If he had I think he would have discovered before opening the tooth that there was a live pulp. Teeth with live pulps will not always respond to heat, but I think they will universally to cold.

Dr. Cushing. I wish to say only a few words on this subject. What has already been said has pretty fully covered the ground. The papers were admirable in their treatment of the new phases of the subject that they separately considered; but I wish to endorse what has been said by Dr. Crouse with regard to the use of the oxychloride of zinc. I have probably capped as many exposed pulps as anybody in proportion to those that have come under my observation. At the time that the oxychloride was first introduced we capped a great many that we had no business to cap, and that we should not attempt to cap now. For a time it seemed that we were going to have very excellent success; but after a time there came a period when we were not apparently so successful. Failures began to appear and led the profession generally, I think, to the conclusion that the oxychloride, through its irritating properties, was the cause.

I came to that conclusion myself, and when the oxyphosphate was introduced, took up that in the confident hope, through the experiences and judgment of others, that it would prove a better material for capping than the oxychloride. I used this with as great care and faithfulness as I had any other material, for a number of years, until I became convinced that it was not so good as the oxy-

chloride. I believe that more pulps die from the effects of the oxyphosphate than ever did from the effects of the oxychloride. I have, therefore, abandoned the use of the latter material and gone back to other.

There were one or two questions just hinted at or not touched upon quite strongly enough, perhaps. We cannot recall these things too frequently to our minds, because we are inclined to get careless in our methods. Dr. Crouse spoke of the operation of capping the pulp as the most delicate operation in dentistry. Unquestionably it is so; and one of the great causes of failure, I think, in very many cases, arises from the careless manner in which the capping is placed upon the exposed point. I mean particularly that pressure is produced where there should be no pressure at all. It is entirely possible to cap the pulp to any thickness, or, if it is necessary, a thin, light capping may be placed upon it without the slightest pressure if we use the oxychloride in sufficiently liquid form. It takes it a little longer to set, but if it is put there properly, it will stay. This is one of the things young men are very apt to neglect. They use the preparation in too thick a form, and are in too great a hurry generally to put their permanent filling over the capping, and so produce mischief which might easily be avoided.

It may seem strange to the younger members of the profession that there should be such varied results in the hands of different men. We cannot all have the same faculty. Some men will be more expert than others in the manipulation necessary to these delicate operations, and their success will be proportionately greater. Some may have better judgment than others as to how cases shall be treated, and herein lies the great secret of the success of many operators who have so large a proportion of successful cases. So you need not be confounded when you hear one man say he has only ten per cent. of failures and another confesses that he has twenty-five or thirty per cent. It is not at all strange that this should occur. When you take the average, there is no question about the advantage, the propriety, and many times the absolute necessity for capping exposed pulps. (Applause.)

Dr. Townsend. I would like to ask Dr. Cushing what he applies to the pulp before capping?

Dr. Cushing. I apply copal ether varnish, a very small drop of it, just to cover the exposed point with a film, and in nine cases out of ten I think I can say there has been no difficulty in the application of the oxychloride.

Dr. Morrison. I wish to add my testimony to what has been said by Dr. Cushing and Dr. Crouse. About the year 1861 I had an exposed pulp in the second superior bicuspid of my own mouth, and it was thought by some of the best dentists of that day that it would be better for me to have the tooth extracted. My teeth were crowded and not of good quality, and the pulp was so exposed that it would have been impossible to wear a metallic filling over it. I took my stand against the extraction of the tooth. I had a little bit of the oxychloride, without any dressing, put over the point of exposure, and I came very near turning a somersault, the pain was so intense. Within a day or two there was a gold filling put in the tooth, that remained in good condition for about fifteen years. Since then I have had the tooth filled once or twice, and am now wearing a platinum crown over the stump. That tooth now, with its shell of platinum and the complete jacket of oxy-phosphate around it, is the most sensitive tooth in my head, particularly to cold. So that oxychloride cappings do not always destroy pulps. Instead of copal varnish, I use wood creosote, to bathe the cavity. Then packing it with quads of bibulous paper, I use French instead of Japanese bibulous paper, as it takes up the surplus better.

In regard to the deep-seated aches in the side of the jaw, where pulps that have been affected by too close opposition of fillings, or where there has been an effort made by nature to restore the tooth, by a deposit of secondary dentine in the pulp chamber. I think we are more troubled in the spring and fall and in changeable weather with this class of cases, because of malarial disturbances. At first you may settle on one about as readily as another; but in the course of about ten days, you may determine which is the offending member. Oftentimes the pulp is dead. At other times I have drilled down and found a live pulp, and made a very serious mistake in opening it up. I must say I feel ashamed of myself every time I do so, and I think we ought to encourage patients to have a little forbearance in such cases; the difficulty may pass off, as it did in my own tooth.

Dr. Harlan. As Dr. Crouse has opened the discussion on the first paper, I will say a few words on the subject. There is scarcely an operation in dentistry more important than that of a sound and correct method of treating exposed or nearly exposed pulps. It is of the first importance, before we come to the subject of the treatment of pulpless teeth. I do not feel that I shall tire you or exceed your patience by calling attention to some things that in the midst of your occupations you may forget, namely, the proper preliminaries incidental to beginning the capping or the treatment of an exposed pulp. Very many cases are treated without the aid of the rubber dam in excluding the saliva, inconveniencing the operator in not giving more direct access to the pulp. This is a matter of great importance, but a matter of minor importance precedes that. That is the cleansing of the mouth with water suited to it in temperature. The injecting of cold water through a small pointed syringe, directly into the tooth where the pulp is quite or nearly exposed, is a serious mistake.

Then, again, after you have determined that it is advisable to cap the pulp of the tooth, it is also advisable that the filling which is made to cover the cap in the tooth should be made of such a shape that should the pulp die it will be easy to enter the pulp chamber without disturbing that filling. I find that a great many very good operators lose sight of that fact especially in bicuspids and molars. They make fillings of such a nature that if you bore through any portion of the filling the whole of it drops out and consequently a great deal of wasted labor lies there before you.

One of the very best things that Dr. Cushing said, in reply to Dr. Townsend, was when he stated that he interposed between the oxy-chloride of zinc and the pulp, copal-ether varnish. It is non-irritant, unyielding and furnishes an agent lying between the pulp, and the irritant oxy-chloride of zinc that will prevent irritation and in that way he gets over the difficulty of having any immediate or subsequent inflammation due to the application of oxy-chloride of zinc. It does not matter so much what you introduce into a tooth to cap the pulp with, if the pulp is in a sound, healthy condition when you determine to cap it, so that something is interposed to prevent shock and irritation at the time of making the capping. That is all important. I have capped a great many pulps and a

good many of them have come to grief. I am sorry to say that in the early experiences of capping pulps I was very careless. I was not exact, and it is for that reason, after an experience of twenty years in the practice of dentistry in one city, where I have been able to see my own failures and the failures of those of my fellow practitioners whose patients have fallen into my hands, that I now say to you, use your utmost endeavors and all your skill and your greatest care, be honest and conscientious, and in that way you will be able to save many pulps that otherwise are needlessly des troyed. (Applause.)

Dr. Sitherwood. With reference to the use of counter-irritants: I use capsicum instead of mustard plasters. I get a capsicum plaster from the druggist, cut it up into the size I wish to use, and give the pieces to my patients to use. I prefer the regular capsicum plaster used by physicians.

Dr. Keith. I would like to ask, when the cavity is varnished with the copal varnish, wherein the advantage then lies of using oxy-chloride over oxy-phosphate, because neither cement comes in contact with the wall of the teeth, as I understand it.

Dr. Crouse. You can use the oxy-chloride with less force. It adapts itself more readily. The oxy-phosphate stiffens and is harder to apply to the pulp.

Dr. Keith. I might add just one word more. Instead of increasing the inflammation I find present in the tooth by the addition of more inflammation on the outside with capsicum, I prefer to quiet the trouble by the application of aconite, either internally or locally.

Dr. Noyes. Mr. President. It has always seemed to me difficult to find any reason except the peculiar circumstances under which it is placed, why an inflamed or exposed pulp should be treated upon any different principles than other irritations or wounds of similar character. If I understand the essentials of successful treatment of pulps either fully or almost exposed, the first thing is the cure of what disease may be present, second, perfect antisepsis of the cavity and the surface of the pulp, and third, the perfect protection, without irritation to the pulp, of the exposed or nearly exposed portion, and the preservation of the pulp afterward as far

as circumstances will possibly admit, against the irritations of heat and cold. For these it seems to me are the most important irritants to which pulps are subjected after fillings are made. I said antiseptic treatment of the cavity, and that is what it is, for to my mind aseptic treatment under these circumstances is practically out of the question. Dr. Morrison this afternoon in regard to another matter, alluded to the superiority and the preference of aseptic over antiseptic treatment in a general way, and it is undoubtedly very much preferable; but the trouble is that the sources of infection are practically always present in the mouth; and we may fairly take it for granted and must, if we want success in the treatment of pulps, that the contents of a carious cavity, or the saliva of the mouth, contain microbes that will produce suppuration if we do not destroy them.

Now, the ends which I have indicated, the cure of the disease, the antisepsis and the protection, may be accomplished by a considerable variety of methods at each step, and there is not the least doubt in my mind that a considerable number of methods of pulp capping which we have heard so strenuously advocated year after year, are successful when the circumstances are favorable, the treatment skillful and the opportunity fair. To my mind the chief means of cure in these cases are the removal of the irritant and the protection of the pulp against further irritation, and occasionally counter-irritation of the gum over the apex of the root; but little more than that can be done. The antisepsis it seems to me in these cases is better obtained by non-escharotic than by seriously irritant or escharotic means. I can conceive of no reason either for irritating or producing an eschar upon the surface of a pulp after the disease in it has been cured. There may be particular instances in which such treatment will be a suitable means for the cure of the disease. That I believe is the case occasionally, but I believe also that the cases are very rare indeed that would not yield to milder methods with less risk and with more promptness and certainty.

Dr. Rowland, of Tennessee. As a stranger among you, although I feel as one of you, for I never feel better or more at home than when my feet press my native soil of Illinois, I want to ask a question. I want to know why in the course of our practice we have patients present themselves to us — as I have had recently

— with perfectly sound teeth, no indication of tartar or pockets or inflammation of any character, but aching and sore? What is the cause of such a condition? I hear you speak of the heat test. Oftentimes we have patients come into our offices with teeth that will respond to heat and that will not respond to cold, or that will respond to cold and not to heat. Why is it? I simply rise as a stranger to ask information.

Dr. A. W. Freeman. I have never seen a tooth yet with the pulp alive that would not respond to hot gutta percha when held against it. If the pulp is alive there will be a response. If not it is dead.

Dr. Rowland. How about the cold test?

Dr. Freeman. There are some cases in which you can get no response.

Dr. Rowland. How do you apply it?

Dr. Freeman. I simply apply the coldest water with a syringe.

Dr. Townsend. I have seen a good many live pulps in which I could get no response from cold water or pieces of ice. I use a heated burnisher and occasionally hot gutta percha. I believe I have never seen one from which I could not get a response, if I applied the rubber dam and applied the rhigolene spray. I think in every case where the pulp has failed to respond to the rhigolene spray I found it dead. I will say that as long ago as eight or nine years I capped recently exposed living pulps with oxyphosphate, and I think they are all alive to-day. I do not think I have ever capped one with the oxyphosphate where it had been recently exposed, that has died.

Dr. Harlan. May I ask what you interpose between the oxyphosphate and the pulp?

Dr. Townsend. Nothing in those cases.

Dr. Harlan. Absolutely no medicament at all?

Dr. Townsend. I may have put in some oil of cloves or something of that kind, but no gutta percha or copal varnish.

Dr. Taggart. In regard to carbolic acid and bichloride of mercury: One main objection urged against carbolic acid in the

treatment of pulp canals has been that it coagulates the albumen, and the bichloride of mercury is very highly recommended in those cases. Any work on chemistry will state as to the bichloride of mercury, that it coagulates albumen, and that the white of an egg is its antidote.

Now, if carbolic acid is not a good remedy, because it coagulates albumen, and bichloride of mercury is a good remedy, and we know it coagulates albumen, how are we to reconcile this apparent contradiction. There must be a mistake somewhere.

Dr. Cushing. I do not think the books say that it coagulates albumen when used in proportion of one to one thousand or one to six thousand. I hardly think one six thousandth will coagulate any great quantity.

Dr. Cummings. Mr. President. After excavating as thoroughly as possibly I apply a little creosote, and let it remain about half a minute. After that is removed I use a mixture of chloroform, cocoaine, morphia and cajeput, on a piece of punk placed directly over the pulp or the sensitive dentine. Next I apply a piece of punk, one side coated with copal ether varnish. I let this remain in the tooth from six to twenty-four hours without removing it. When satisfied with the conditions I cap with a little copal ether varnish and put in whatever filling seems indicated. If I think further treatment is needed, I puncture the crown of the pulp and use carbolized olive oil or glycerine. I prefer glycerine. The proportions of the recipe I mentioned are:

Chloroform, 20 minums.
Hydry-chlorate of cocoaine, four per cent. solution, 46 minums.
Morphia sulphate, one-half grain.
Oil of cajeput, 2 drops.

The glycerine or olive oil proportions with carbolic acid are as six to one. I have been using these for three years and have been successful with them.

Dr. Harlan. Mr. President: I wish to say that the ingredients of this prescription are insoluble in the proportions in which they are given. Forty-six drops or minims of that solution of cocoaine will not dissolve with 20 minims of chloroform. It is simply a mechanical mixture.

Dr. Cummings. I first use cocoaine with morphine as a paste

and then it is cut with the chloroform and flavored with the caje-put.

Dr. Gardner. I would like to ask Dr. Crouse if he uses copal ether varnish?

Dr. Crouse. I have not done so, but I shall have to go home now and torment my patients with something new.

Dr. Stevens. Mr. President: I am exceedingly glad that so many of the dental profession are succeeding in capping exposed pulps; but they remind me of a gentleman in this society who declared he had not used amalgam in five years, when a friend sitting by my side said he knew better, he knew he had filled his sister's teeth with amalgam within two years. Now I never yet have saved an exposed pulp by any of the means that have been here spoken of, having tried them all, and as I stated two years ago, I defy any man to show me one living after two years. I made that assertion at that time, and one gentlemen who was having a tooth filled at the clinic said to me, "Here is one." But in a very few minutes I was convinced and convinced him that the pulp never was exposed, simply sensitive dentine. I would be very glad if some of these gentlemen when they are going to operate on one would let me know. I should like to see them perform the operation, and then I would like to see the patient after a few years. I confess I never have saved one and I have great doubt about the operation.

PROSTHETIC DENTISTRY.

*DISCUSSION FOLLOWING THE READING OF DR. HASKELL'S PAPER.

"SOME DIFFICULT CASES AND THEIR TREATMENT."

Dr. Swain. Mr. President: The question of prosthetic dentistry to us as a profession is of great importance and one in which we all are or should be deeply interested. It has seemed almost as though this branch of our profession had been tabooed in societies, and certainly not much matter new or original has been given us for a number of years aside from bridge work with its improvements and artificial crowns to be set upon the remaining roots of teeth. It certainly is a subject to which we should give more attention, and I am more and more convinced of this as I become familiar with the methods of teaching in our schools. So far as I know, the matter is being continually neglected. In the last two or three years, in my own office, I have had experience with young men who had graduated from dental colleges, as assistants, especially in the laboratory, and I find that what they have learned they have mostly to unlearn, for as a rule more has been taught them of error than good. I am sorry to say this but it is true. The question before the house now is "*Difficult cases and how to overcome them.*" That is something I do not know that I can give very much information or instruction about. Certainly the first thing to consider is a correct diagnosis of the case. There is a great difference in men in deciding what shall be done, when cases are presented to them. One man will study a case for a long time and become fogged. He tries this or that and it is an experiment with him from the beginning. Another, of less experience perhaps, will look the mouth over, and his diagnosis is correct almost instinctively.

*Dr. Haskell's paper having been published—see Items of Interest, June, '88—does not appear in the Transactions.—Pub. Com.

Of course one of the most important things is to secure a correct impression. The most difficult mouths which we have to treat, as a rule, are those of uneven hardness—those that are very hard in places, and in the sides of the palatal arch have what we might almost call wind-bags—tissues so loose under the fingers they seem to fluctuate as though filled with air. My experience has been that plaster in such cases is not sufficient. Where plaster is used we are told that it must be scraped—cut away here and there, perhaps added to a little in other places in order to secure a proper bearing. My experience has been that this does not do. Few men have that fine judgment which tells them just where and how to cut away. Therefore my method has been to take the first impression in wax. The wax has sufficient resistance in taking the impression to crowd back the soft tissues so that over those points the impression is, as you may term it, fuller than when a plaster impression is taken. A set of teeth made from that impression I have found more apt to be successful than where I have attempted to trim the model. Of course in these cases no one man can lay down rules for all other men or all cases. The exceptional case is where the fine judgment of the prosthetic dentist comes in.

Another class of difficult cases are those in which the alveolar process is absorbed in the region of the anterior teeth. I speak now of the upper jaw—as far back possibly as the second bicuspids; leaving a cartilaginous ridge which is loose and flexible. In attempting to take an impression with any material this ridge is pushed out and we have in our model a more or less heavy undercut. I had a case of this kind some time ago. It had annoyed me much. Dr. Ames being in my office, I asked him what he would do with it. He answered me readily, I followed his advice and with the best of success. It was to go over the model, that is the front portion which projected, with my knife, trim it off, making it nearly straight, being governed by my judgment in the matter as to how much to cut away, and then adding a little wax to the top of the ridge of the model to allow for the crowding back of this soft portion.

As to the lower partial plates mentioned, it is true that very often one will say, "I have been told by Dr. So and So that partial lower plates could not be made." I believe that no substitutes are

with it. I have had only two or three such cases and found them all difficult to fit with a plate which could be worn with comfort.

In arranging teeth for a natural effect it is sometimes really necessary to drop out two; instead of having fourteen have twelve, and then you can arrange them so as to avoid the prominence mentioned by Dr. Swain.

Dr. Ames. Mr. President: I wish to say that it strikes me that the essay was upon the mismanagement of cases rather than upon the management of difficult cases.

The extraction of sound teeth is only justifiable, I consider, in the preparation of a jaw for a full denture, and in the preparation for a partial denture when one or more teeth are so situated as to render a practical and artistic arrangement of the artificial substitutes an impossibility.

Beyond those two cases I cannot see that the extraction of sound teeth is justifiable. The extraction of sound lower teeth on one side of the mouth because there appears to be no masticating teeth on the other, is altogether erroneous in my opinion. The upper plate can be so constructed and the teeth so put upon it, that whatever the ordinary position of the lower teeth, the difficulty can be met. The idea of the essayist was to extract the lower teeth. Now, the great trouble is with the upper plate in the cases mentioned; it does not extend out or upward far enough; if you feel in your mouth you will find there on the malar process of the superior maxillary bone a firm tissue. In any mouth, however soft the alveolar arch, that tissue covering the malar process is firm and dense, and you can run the plate out there, and take advantage of the flaring. If not, in such cases the plate will necessarily tilt. In addition to running the plate out to that extent, arrange the teeth so that in biting on that side the pressure will be toward the center of the mouth, and then you will not have a tilting of the plate.

Another case mentioned is where a lower plate is needed and some roots of the masticating teeth remain. The essayist considered it necessary to get rid of those roots before placing a denture there. I should consider it very desirable to have the roots there. I would trim them down, shape them properly, fill the canals and put the plate over them. Placing the plate over these

roots, especially if there is a good one properly located on either side, prevents the plate settling; the pressure is on the root instead of the narrow alveolar ridge, and you will have a good practical piece of work there for years afterward — better than if you had extracted the roots.

Now, if you have a third molar on either side, and some anterior teeth, you can construct a partial lower denture and have it supported. If you will make a partial gold plate — and that is the only thing I consider practicable — you can let the posterior surface of the anterior tooth act as a support, and have the posterior ends of the plate supported by the molars by means of little lugs or partial caps extending upon their masticating surfaces. The pressure then comes on the teeth, not on the gums; you do not have the partial lower denture resting on the narrow alveolar ridge, the plate cannot settle and the result will please your patient and please you.

Dr. A. W. Freeman. In a case like the one spoken of by Dr. Ames, where all teeth back of the bicuspids were gone—I prepared the roots of the right upper central and left cuspid; filled upper part of each nerve canal with chloro-percha; fitted gold and platinum bands to these roots, and inserted strong platinum posts, filling around them with amalgam.

I struck up a thick gold plate fitting closely to the gum on the lingual border, making holes in it for the posts, but bearing firmly upon the ends of the roots. I clasped the right cuspid; made a thick cap, to elongate the bite, with a half band and a half clasp for the second left bicuspid which was tipped backwards considerably. I put a short crown upon a rather loose inferior right first bicuspid, which soon became tight after use.

I put a left central, right central, left lateral, left cuspid and a molar upon the plate.

As the lower bicuspids were very large, my patient had a good bite and a very satisfactory plate.

with it. I have had only two or three such cases and found them all difficult to fit with a plate which could be worn with comfort.

In arranging teeth for a natural effect it is sometimes really necessary to drop out two; instead of having fourteen have twelve, and then you can arrange them so as to avoid the prominence mentioned by Dr. Swain.

Dr. Ames. Mr. President: I wish to say that it strikes me that the essay was upon the mismanagement of cases rather than upon the management of difficult cases.

The extraction of sound teeth is only justifiable, I consider, in the preparation of a jaw for a full denture, and in the preparation for a partial denture when one or more teeth are so situated as to render a practical and artistic arrangement of the artificial substitutes an impossibility.

Beyond those two cases I cannot see that the extraction of sound teeth is justifiable. The extraction of sound lower teeth on one side of the mouth because there appears to be no masticating teeth on the other, is altogether erroneous in my opinion. The upper plate can be so constructed and the teeth so put upon it, that whatever the ordinary position of the lower teeth, the difficulty can be met. The idea of the essayist was to extract the lower teeth. Now, the great trouble is with the upper plate in the cases mentioned; it does not extend out or upward far enough; if you feel in your mouth you will find there on the malar process of the superior maxillary bone a firm tissue. In any mouth, however soft the alveolar arch, that tissue covering the malar process is firm and dense, and you can run the plate out there, and take advantage of the flaring. If not, in such cases the plate will necessarily tilt. In addition to running the plate out to that extent, arrange the teeth so that in biting on that side the pressure will be toward the center of the mouth, and then you will not have a tilting of the plate.

Another case mentioned is where a lower plate is needed and some roots of the masticating teeth remain. The essayist considered it necessary to get rid of those roots before placing a denture there. I should consider it very desirable to have the roots there. I would trim them down, shape them properly, fill the canals and put the plate over them. Placing the plate over these

roots, especially if there is a good one properly located on either side, prevents the plate settling; the pressure is on the root instead of the narrow alveolar ridge, and you will have a good practical piece of work there for years afterward — better than if you had extracted the roots.

Now, if you have a third molar on either side, and some anterior teeth, you can construct a partial lower denture and have it supported. If you will make a partial gold plate — and that is the only thing I consider practicable — you can let the posterior surface of the anterior tooth act as a support, and have the posterior ends of the plate supported by the molars by means of little lugs or partial caps extending upon their masticating surfaces. The pressure then comes on the teeth, not on the gums; you do not have the partial lower denture resting on the narrow alveolar ridge, the plate cannot settle and the result will please your patient and please you.

Dr. A. W. Freeman. In a case like the one spoken of by Dr. Ames, where all teeth back of the bicuspids were gone—I prepared the roots of the right upper central and left cuspid; filled upper part of each nerve canal with chloro-percha; fitted gold and platinum bands to these roots, and inserted strong platinum posts, filling around them with amalgam.

I struck up a thick gold plate fitting closely to the gum on the lingual border, making holes in it for the posts, but bearing firmly upon the ends of the roots. I clasped the right cuspid; made a thick cap, to elongate the bite, with a half band and a half clasp for the second left bicuspid which was tipped backwards considerably. I put a short crown upon a rather loose inferior right first bicuspid, which soon became tight after use.

I put a left central, right central, left lateral, left cuspid and a molar upon the plate.

As the lower bicuspids were very large, my patient had a good bite and a very satisfactory plate.

MAKING AND TEMPERING DENTAL INSTRUMENTS.

BY DR. J. FRANK MARRINER.

The making and tempering of dental instruments appears to be looked upon by many as an exceedingly difficult operation, which very few know anything about, seemingly enshrouded in mystery. While the facts are, it is a very simple as well as useful and valuable accomplishment, one that every dentist not only should, but may easily acquire. Very few tools are required that are not found in every well appointed dental office.

Should he wish to become an expert in this department, a forge will be found a very valuable acquisition, and I would advise him to get one of Fletcher's gas or gasoline forges, say No. 19. With this simple appliance tools or instruments can be forged without injury to the steel, and for repairs it will be found very particularly useful. Instructions for using can be found in any catalogue of Fletcher's "Laboratory Apparatus." The expense, with foot-blower, blow-pipe and rubber tubing complete is, I think, about $18.00. Add to this a medium-sized anvil, and two or three properly shaped hammers of different sizes.

If one has a decided taste for this kind of work, he will probably procure many other appliances of value. But for the ordinary dentist many of these will be unnecessary, for with the simpler apparatus he can do his own work with little expense. He may easily make a new instrument for some particular operation, better suited to the purpose than any he can buy.

Fletcher's solid flame burner No. 46 gives a flame free from smell, and of great power, works perfectly with any gas supply, and can be had for $2.00. With this burner and a good mouth blow-pipe, you will be surprised at the amount of work one can accomplish. With a little practice, care and judgment, almost any

dentist will in a short time be able to make quite a number of instruments perfectly adapted to his wants, as well as temper all his instruments, many of which have been elegantly shaped perhaps by other hands, though not properly tempered.

In forging, the first thing is to know what we want, to be able to see the instrument as wanted in our mind's eye plainly when we commence as when it is finished. With this end in view, we proceed to forge the instrument wanted, exercising care in heating, as by over-heating steel is injured; nor should it be hammered before the requisite amount of heat is obtained, nor too long after, and we should be careful to divide as evenly as possible the force of the hammer.

We should not hammer too long on one side of the steel, but at every blow turn it, striking first one side then the other, making each blow help to bring out our ideal form.

Having seen while operating the need of an instrument which we do not find in our cabinet, we proceed to make one, and as we carefully watch the blows of the hammer our piece of steel gradually assumes that form so indelibly stamped upon our mind; each blow brings it nearer perfection, until we see, not in imagination but in solid steel, the exact form that has so vividly occupied our mind's eye, with this difference, however, that it is a little larger than it will be when finished. This, of course, applies to small instruments, such as thin, long and light scalers, long blade excavators, etc. Do not be too particular in forging as to size, be sure to leave it large enough for grinding. But be exact as to form, never using a file for this purpose, but hammering into shape in every case.

In this way you will have an instrument tough and springy, with a cutting quality that will hardly be obtained by filing; for when we file we invariably make the cutting portion too near the size it is to be when finished, consequently when tempered, because of its smallness near the point, it will crumble, while further away in the larger portion it will turn, and is of course worthless. I would impress this upon the mind of any beginner, not to forge the instruments too small; better be all day in grinding. This is particularly important as to small instruments.

We have our ideal instrument forged roughly, but perfect as

to shape or form, and larger than it is to be when finished. We will now with fine sand paper, emery cloth, etc., remove the effects of the heat, making it thoroughly clean and bright. This should not be neglected at this point, and must be repeated at every subsequent heating until finished.

We now have an instrument ready for tempering. With solid flame burner (not using the forge), blow-pipe, cold water and all other things in place, with instrument in left hand holding it in or near the side of flame, with blow-pipe throw a flame upon it, heating evenly, all the while gently rotating the point until the heat reaches a bright cherry red. Now quickly plunge it into cold water. With practice, care and judgment, one will soon be able to tell almost the exact temper he has obtained by its color when plunged into the water. Should you be in doubt, however, one or two strokes of a file across the tempered steel, with a little experience, will tell you instantly, though it is not so easy to explain.

If it proves too soft, clean it as before and give it a second trial, pursuing the same line of action as before, carefully observing the heat for a higher temperature. With the beginner this performance may have to be gone through with a number of times.

We are now supposed to have an instrument forged and highly tempered. Again, with fine sand paper, emery cloth, etc., we proceed to remove the effects of the heat, being careful not to break it, particularly at the neck, as it is highly tempered and capable of little resistance. And we all know that the instrument, though forged as we desired and highly tempered, is as yet unfit for use.

But we again remove the effects of the heat and take the next step, which we hope and believe will make it not only useful, but a thing of beauty and a joy while it lasts. This step consists in drawing the temper It must be remembered that we have now, blade, neck and shank, all of the same temper, and to make it useful must draw the temper so as to give us a spring at the neck and shank without injury to the cutting edge. This may be accomplished as follows: Having made it clean and bright so that we can instantly note any change in color from the effects of the heat, force the blade or cutting portion, whatever that may be, into a piece of clean, soft pine, which may be one or two inches square, and with blow-pipe throw a flame upon the larger part of the

shank which will assume a light or deep blue color, as the artist may desire.

If the cutting edge now embedded in the wood be small, carefully note the blue color as it passes up the neck, and stop it just before it reaches the wood, but if large let the blue color run to the wood, and there check it instantly.

If all our moves have been successful we will have an instrument, shank sufficiently unyielding, with spring temper at the neck and a keen cutting edge that will neither crumble or turn in use upon tooth substance.

In drawing the temper of long-bladed instruments, such as long thin scalers, or long-bladed excavators, do not force more than one-third or one-half of the blade into the wood, leaving the balance of the instrument exposed, with instrument clean and bright. With blow-pipe throw a flame upon the shank, and with great care watch the blue color as it moves down the shank passing over the neck, and as it strikes the blade be careful to arrest it in a bright straw color just before it reaches the wood. This will give us a spring temper throughout. Now we have an instrument that, as we believe, is so far a success. But there is one very important process yet to go through before we call it finished.

You will remember that the blade or cutting portion is yet larger than we wish. And it is now tempered and too hard to file, which should never be resorted to in any case. Its size should be reduced by grinding upon a wet stone.

The stone or stones should be evenly balanced and run true, and be kept constantly wet. This advice or caution may seem superfluous, but it is not. It is surprising how careless many of us are about such things. A great many lathes are sadly out of order, and when a stone is put in place and started, we see quick enough that it wabbles.

The first position of the instrument upon the stone should be made with care, as you wish it to be all the way through. Now grind until your instrument is as thin and delicate as you desire, holding it squarely and firmly upon the stone, not allowing it to rotate or tremble in the fingers.

On removing it for any cause from the stone, be particular in

returning it, to do so squarely and in the identical position it occupied before removing, and ever remembering to keep the stone wet. Should this be neglected, it takes but a moment to lose all the work and time spent in tempering.

By this method I think you will have an instrument finely finished, very tough and springy, with a keen edge and capable of great resistance, even when very thin and delicate; and delicacy in a dental instrument is of the utmost importance.

And here I wish to reiterate what I have so often said before, viz: not one instrument in ten but is made too heavy. They are clumsy. For this reason I began making instruments for my own use. Nearly all the small instruments on the market to-day would be better if made lighter, more delicate, with a greater spring in their temper, instead of being so rigid and strong. An instrument should be so tempered that when very delicate it will *cut* tooth substance and not *batter* it down by force. A chisel, for example, that will not make a clean cut upon any tooth, shaving after shaving, doing its work clean and easy, needs, in my judgment, to be retempered.

Another example. Take a majority of scalers on the market to-day, and carefully compare them with a set devised not long ago by Dr. George H. Cushing. It would be useless for me to say anything here in favor of those last named. All one has to do is to compare them with any or all others to appreciate their delicacy and adaptability.

When you have become accustomed to using them you will wonder how you ever succeeded with others.

DISSCUSSION.

OPENED BY DR. CUSHING.

Dr. Cushing. Mr. President and Gentlemen: I do not know that there is any discussion to be had upon this paper. It has covered the ground completely and given you such instructions for the manufacturing of instruments that I think anyone who cares to make his own cannot fail to succeed if he follows the directions. I will say a word or two as to the importance of the dentist being able to make his own instruments. This ability is especially of value to the country dentist, that is to the dentist away from the depots of supplies. There are many times when he breaks an instrument, and he is very apt to have only one of a kind, and if he is incapable of making his own instruments he is in trouble and must do his work with something less adapted than he desires. While this knowledge is of the greatest value to men who are away from the centers of supplies it is also of great value to the city dentist who does not want to go to the depot if he happens to break an instrument and does not have a duplicate. If he knows how and can make one in five minutes he can then complete his operation with much greater satisfaction and speed and comfort to himself and to his patient than if he had used an instrument less adapted to the work in hand. I suppose most dentists are in the habit of making over instruments occasionally and the majority of them, according to my observation, make very poor ones; simply because they have not studied the subject of the management of steel.

Not one man in ten of those who make instruments to-day succeeds in properly tempering them. Either through carelessness or from some other cause the manufacturers fail to furnish us the kind of instruments we need. I rarely buy from the dental depot any of the ordinary excavators, that I do not have to re-temper them. They may be beautifully finished and admirably shaped,

and yet they are worthless for cutting what we have to cut. There is something about the handling of steel that the majority of steel workers do not seem quite to understand. There are no two lots of steel probably that are exactly alike, requiring the same management to produce the same results. All of a given lot of steel manufactured at the same time would require the same treatment; but if you buy two separate lots you may have to manage one very differently from the other, and the process that would give you a splendid temper with one lot would produce only worthless instruments with the other, and this knowledge of how to treat any given lot of steel must come from experiment upon that lot.

The points essential to be observed in the handling of steel for the purposes for which we require it are, first, not to overheat it. Very few men understand how easily it may be spoiled by overheating, or what overheating is. The authorities on the subject all agree that steel should not be heated much above a cherry red, even for forging. Most of you very likely would think it necessary to heat it to a white heat as you would iron. You will spoil your steel if you attempt to do that. It has to be heated and re-heated very frequently. It must not be heated beyond the point of a cherry red, perhaps a bright cherry red. The forging is a necessarily slow process, and particularly so with the very small points that we have to deal with; and, as stated in the paper, it is very important in forging that the steel be turned half around so that the blow comes first upon one side and then upon the other quarter, so that the steel may be compacted thoroughly. If you hammer it all from one side or if you turn it completely over and hammer it on the other side you are spreading it continually, and are not getting it compacted and made homogenous as it should be.

The only practical instruction that I ever received about this matter was from Dr. Corydon Palmer. Some of you are aware that he makes a finer instrument for cutting than any other man in the United States to-day. By following his instructions I have been able to make for myself instruments that I could not buy. With regard to tempering, as I have said before, every lot of steel requires to be managed after its own peculiar nature and you must ascertain what that is by experiment. You must test the degree of heat which is necessary to harden your steel. The rule is to

heat it to the lowest possible degree at which it will harden, and that is said to be a low cherry red. Many times, however, you will find that that degree will not harden it. You must try it at the lowest point first. If you find that it does not harden sufficiently at that, you must then heat it to a little brighter red, until you reach the lowest point at which it will harden. Having reached that point, you have got the cutting temper that you wish to retain, and that temper must not be drawn one particle upon the cutting part of the instrument. You then proceed as suggested in the paper, after removing the scale thoroughly and passing the cutting end of the instrument, so far as you wish to retain the hardness, into the little block of wood. It is not necessary for the block of wood to be an inch square, as the essayist says. It does not need to be more than a quarter of an inch square, a quarter of an inch long for the most of the blades that we have to temper. Running the blue completely up to the wood you have a perfect spring temper up to that point, while all beyond that is just as hard as you originally made it. If you then follow the instructions for carefully grinding down and shaping the instrument, you will have one such as you cannot buy.

I wish to emphasize a little more than the essayist did, the necessity for having more delicate instruments than we can buy. The ordinary hatchet excavators are too thick and clumsy. No matter how perfect the temper may be, they are still too thick and clumsy to do the most effective work in the best possible manner and with the least pain to the patient. Those who have never tried the experiment cannot realize how much more easily one can operate by using an excavator that is slender and delicate, and with how much greater ease to the patient the operation may be performed. And you may have a very thin, delicate instrument that will do very effective work, if tempered in the way that I speak of. One word as to what you may or may not expect from instruments of the character that we have described here. You must not expect they will stand as much as a big, strong pick would. They are made to be handled delicately, not to break down the tissue with, but to cut it down and shave it. Do not expect you can bear on with the force that you could with an ordinary instrument that you buy from the stores, though they will resist a greater amount of force than you would suppose possible.

And one word of advice to those who do not know this point as well as some of the rest of us do, and that is, have a good sized whetstone and use it frequently. It is astonishing to go into the offices of some men and see the instruments that they attempt to work with—without any edge at all. It does not make any difference what the temper of such an instrument is, they might just as well try to cut tooth substance with an old hoe. All they do is to break down the substance and rasp it off by sheer brute force. The majority of the stones that are used for this purpose are too small. They are little things about two inches long and half an inch wide, and they are utterly worthless. That is to say, a dentist cannot sharpen an instrument perfectly on such a stone without taking great time, and in a very little while he makes a groove in the center of the stone, when it becomes really worthless for any nice work. The stone should be broad and long enough so that you can sweep over the whole surface, (say two by four inches,) and after you learn to use it properly you may use it for years and maintain a plain surface, if you do not keep whetting the instruments always in one line.

Dr. Newkirk. What kind of a stone do you use?

Dr. Cushing. Arkansas stone, the kind that almost everybody uses. If they do not they should.

Dr. Newkirk. I did not know you could get them as large as you speak of.

Dr. Cushing. I think they are to be had of that size at the dental depots. At any rate they can be had at the hardware stores. Keep your instruments just as keen as you can make them and sharpen them so that they will cut like a razor, and do not try to use them for half an hour continuously without re-sharpening, because it will delay and annoy you. The moment you find an instrument is getting dull, re-sharpen it. It will save time and money and be a matter of great comfort to your patients if you will learn no use keenly sharpened instruments. (Applause.)

Dr. A. W. Freeman. I want to ask if in tempering an instrument, after you put it in the pine block, do you immerse pine and all in the water, or do you keep the pine out?

Dr. Cushing. I immerse wood and all in the water. The

putting the point into the block is to prevent the spring temper, or any temper less than that which the original hardening gave the instrument, from going beyond that point. There are various ways in which this may be accomplished. Some hold the end in a pair of pliers. You can accomplish the purpose much more quickly by using the wood and you may let the blue run completely up to the wood and if plunged then into water it will not go beyond it.

Dr. Stevens. Do you wet the wood?

Dr. Cushing. That is not material. I generally do. It does not make a very great difference unless it is a very fine point. If it is a very fine point, it is desirable to wet the bit of wood first.

Dr. Ames. I would like to ask what is the color of the point when you remove the wood?

Dr. Cushing. Just the same color it was before.

Dr. Ames. You have not drawn the hard temper of the point at all.

Dr. Cushing. Not a particle. That is the very thing you want to accomplish. You get first the temper that will give you the greatest strength of the steel without being brittle, when it will not chip, when it is tough and yet can be made very keen. That temper you do not wish to draw at all. You get that in the hardening, and that is the point that it is so essential to be careful about, to try until you do harden it at the lowest heat at which it will harden. That is a matter of experimentation, as I have repeatedly said before.

Dr. Ames. Then a good article of steel that is full hardened is not brittle?

Dr. Cushing. Yes, it may be if you heat it beyond the point I speak of. You will still have it as hard, in one sense.

Dr. Ames. But it is not a good article of steel.

Dr. Cushing. Yes, it is a good article of steel but if it is heated beyond this point it becomes very hard and it is more brittle than when heated at the lower point.

Dr. Ames. It is tougher at the lower degree.

Dr. Cushing. Precisely. It is tougher if it is not carried

to the extreme point of heating. You will find sometimes, in some of the steel that you will handle, that you will have to bring it to a bright cherry red. Some of it will require to be heated as much as that before it will harden, but some steel will harden at a very low temperature, and that is a matter which you have to test, with each lot of steel. It must be the lowest point at which it will harden, and then you have it in its toughest state, and you get this great strength of edge without having it liable to break or chip out.

Dr. Morrison. Mr. President and Gentlemen: I am interested in this subject and have been much benefited by the paper and the remarks. With Dr. Cushing, I have been astonished to see the class of instruments, the order in which they are kept and the manner they are used in many dental offices, and by good operators. Most of us have many instruments with the points broken off, thrown aside as worthless, when in reality a breakage is often the best thing that can happen, if a dentist has a little knowledge concerning the use of steel. He can make a point on a broken instrument that will be worth ten times as much as the original instrument. As the instrument came to him it had a shank that did not quite balance. There was something wrong with it and finally it was broken. Now, if this instrument is treated as Dr. Cushing and the essayist have explained, and a nice blade formed upon it, the dentist will have a better instrument than before.

I take issue with the paper and the speaker in that they depend a good deal upon the whetstone and the corundum wheel or grindstone to reshape instruments instead of the hammer and the anvil. I wish to impress this point particularly that you should forge the instrument exactly as you want it, with the anvil and the hammer. I will show you in my instrument case many that have not been touched at all except just at the keen edge, on the whetstone. The other parts are just as they came from the anvil. And with a little practice you may be able to make them in this way. The advantages are the very compression which you have made upon the surface of the steel with the hammer is retained — that outside shell of compressed surface of the steel that seems to be just a little harder than the metal beneath. To any mind this is a valuable consideration. Then, instead of having the blade ground like a carpenter's

chisel, with square edges, if it is forged right the blade will be a little longer at the center than at the corners and have the appearance of a well formed woodsman's ax; not these modern hatchets, but an ax with the corners rounded.

The hardening can be varied by the temperature of the water in which you cool it. I prefer cold water, and when I say cold water I do not mean a glass taken from the hydrant and allowed to remain in close proximity to the flame. Have your instruments all ready, and go through the tempering process at one time. If it is summer time it is best to have a little piece of ice in the water. In drawing the temper instead of wood I use either a block of tin or lead, a chunk about as big as your thumb. I run the blade into that the sixteenth of an inch, say it is an excavator that is one-eighth of an inch long or less. I can then put it fearlessly over the Bunsen burner or alcohol lamp; not blowing the flame upon it, because we cannot grade the drawing of the temper as we can by holding it over the Bunsen flame. I watch every grade of the process, carrying the blue color slowly down; and as the blue goes down toward the turn of the instrument, and turns down toward the cutting edge, just as it gets to the point where it enters the lead I drop it immediately into the water.

I temper an excavator and a plugger differently. It depends a great deal upon the pressure I wish to exert. If for end pressure it will bear a pretty stiff temper. It can be left between the straw and the blue color. I use a great many pluggers of such temper, but if it is one that is to have a great deal of lateral pressure the temper should be drawn down well into the peacock blue. With Dr. Cushing, I must say that I place but little confidence in the tempering of the instruments as they come from the shop. The heads of the houses are indeed doing the best they can, but it is the man at the bench the whole thing rests with and he may or may not do his work well.

Now, with regard to instruments for removing fillings and making pits, the burrs that have the ends broken off have just a nice taper. Take a jeweler's ordinary pin vise, drill a hole in the end of it that will just take the bit, allowing the instrument to slip down and grasp it well. With the square head of this pin vise as a guide, as Dr. Cushing has so beautifully illustrated, carry

them into the flame, and then if you want to make a slim, delicate instrument you can forge it over the round end of the anvil just as you have seen a blacksmith draw a horseshoe nail. When you have the shank a little more delicate than the end, straighten it carefully. As it is to be used in the engine, of course any little irregularity will impair its usefulness. Simply forge it and straighten it. Then at the extreme point give it a spear point by just flattening it enough to make the blade a little wider than the shank. Harden it in the way described and you have an instrument you can do almost anything with in the way of reaming canals, making retaining pits or removing fillings.

Dr. Cormany. For an excavator, take the instrument just where you have broken the point off, it is just a little curved. Put the point in the flame and when it becomes hot so that it will bend just tap the end a little with your hammer, and that makes the curve. Then heat it again and lay it upon your anvil and make the blade. Grind the point to suit you, sharpen it as much as you can by hammering, put that in the flame and hold in your left hand a piece of ordinary soap. Heat the point to a cherry red, and stick it right into the soap and you will have an edge temper that will suit you exactly, and in the shank a beautiful spring temper without further treatment of any kind.

Dr. Morrison. At the Iowa meeting there was a gentleman managing the Land furnace who stated that when a dentist wanted to make a drill to cut porcelain or anything of that kind, he could with the Land blow-pipe blow an intense flame on the steel and give it a black diamond edge, tempering with water.

Dr. Taggart. There is a little work on the management of steel from a scientific standpoint, issued by the Crescent Steel Company, of Pittsburgh. They have a branch office in Chicago. Of course, it is in a sense an advertisement, but the subject matter is applicable to the subject in general. It tells why steel hardens, how to get the temper desired, and so forth. It is a book for free distribution, but we would have to pay a dollar or a dollar and a quarter for a technical work of equal value. I find it is considered an authority by the best steel workers in the country. A letter addressed to the Crescent Steel Company at Chicago will get it, and it is really a valuable work.

Another point. In these excavators that we break and try to repair, if we do not get as good results as we would like to have, it may not be our own fault. The instrument may have been spoiled by the former heating.

In making an instrument it is not always best to take one that has been worked by some one else. He may have burned out the carbon by overheating it. It may have been the best steel in the world in the first place, but bad treatment may have made it entirely different.

As to the scale that forms on steel when we heat it red and plunge it in water, that may all be avoided by smearing the piece with ordinary yellow soap — soap that has rosin in is best. When the instrument comes out of the water it will be of a dull gray color without a particle of scale. This is more applicable treatment for instruments that you are not going to finish after tempering such as clamps, etc.

There is another way of tempering steel to make it very hard. The little wheels in glass cutters are tempered by heating to a very high temperature and plunging into mercury. Mercury will make steel about five times as hard as the ordinary tempering. It is not known why, but it will do it.

Dr. Nelson. After you have hardened the instrument in water, haven't you got to temper it?

Dr. Taggart. You have to draw the temper afterward. In drawing the temper you do not bring the heat high enough for the scale to form.

Dr. Wassall. I would like to speak of a method of giving the instrument its first heat, the cherry red, which was spoken of in the Chicago Dental Society after the reading of a paper on this same subject recently. It is the process that is used I think by our dental manufacturers. It gives the requisite temperature and obviates the dangers of overheating and the removal of the steel properties. It is by heating the instrument to be tempered in super-heated lead —lead that is not only melted, but heated to a cherry red.

I want to speak of a method of drawing the temper of Swiss broaches. A great many use them now, but they come to us very

hard and brittle. Put a dozen or two of them in one of Williams' gold cylinder bottles. By taking a little section out of the cork the bottle will not be burst by air expansion. Heat the bottle where the temperature will be low at first and gradually raised. You can do it over the kitchen stove by placing it first at the back of the stove and gradually advancing it. By looking through the side of the bottle you can tell exactly when the broaches are drawn to a blue color; turn off your fire and let them cool slowly. By covering up the broaches with carbon in a tin box, or imbedding them in sand or lime in the shell of a cartridge, as has been recommended, you do not know just how hot they get; you are unable to temper them to your wants. I like to have some with that hard quality which we find in the Donaldson broach. Will the essayist please state what kind of grindstones he uses in grinding down instruments.

Dr. A. W. Freeman. In finishing very small instruments instead of grinding I use a file. I give the point a few nice taps on the anvil, which gives a better cutting edge from the hardness the steel acquires under the hammer. I prefer to polish the surfaces of my instruments with emery paper, so that there is no finish required after I have hardened them and drawn the temper, except at the point. In making a very delicate instrument, as suggested by Dr. Taggart, I hold it in the flame, and when I can see that the color is proper to bend the instrument, I can get an acute angle by one or two gentle taps of the hammer on the end of the instrument.

To prevent scaling, I have for years used soap as described. I warm them and just touch them to a piece of soap, and sufficient adheres. Finishing files and many small instruments and handy appliances, some of which are not sold at the dental depots, and others which are better, sometimes cheaper, can be obtained from *Wholesale Jewelry Houses*.

Dr. Swasey. I have listened with interest to the paper and many of the remarks, but I have felt that I did not know a great deal about the subject and that I was not entirely alone. Many of us in the first place do not know exactly what we want and when we do we cannot make it. If I want a cheap instrument and to make it quickly I heat it to a red and plunge it into wax.

Dr. Cushing. I wish to ask the indulgence of the society to reply to a remark of Dr. Morrison. I think it a fallacy that grinding in any way injures the instruments. I do not profess to know so much from experience or study of the subject; but Dr. Corydon Palmer and the best authorities I can find on the subject of steel, all insist very emphatically upon the importance of grinding the instrument after it is finally hardened.

Dr. Ames. I want to say that since Dr. Taggart has furnished us with the means of making these excellent corundum points so cheaply, we may do our grinding with the dental engine, which runs perfectly true.

That which prevents the formation of the oxide or scale, is the glyceride or fat of the soap, and we may get the same effect with glycerine or some form of fat.

Dr. Crouse. It seems to me that if our patients could have been here it would have done their souls good to hear us discussing methods of doing work for them carefully and well, instead of fighting for two or three hours as to whether we were medical men and belonged to the medical profession. (Laughter.) It has been valuable to us, and I think they would have appreciated it.

A LECTURE ON THE RATIONALE OF CONSTRUCTING AND ATTACHING ARTIFICIAL CROWNS TO NATURAL ROOTS OF TEETH.

BY DR. JOHN J. R. PATRICK.

It is generally conceded by well informed members of our profession, that all roots of natural teeth that are in a healthy condition, are available as substructures for artificial crowns. But the construction of artificial crowns and their adjustment to the natural roots or teeth are not in my opinion sufficiently understood. I will, therefore, ask your attention while I present a few principles that are involved, which if not recognized must result in defective work. Now, in order to secure the best results in attaching an artificial crown to the root of a tooth, a gold band passing between the gum and encircling the root of the tooth is the first step in the process after the root is prepared; and all success will depend on the nice adjustment and close fit of this band, for I maintain that a band of gold fitted to the root of the tooth to be crowned, is indispensable, and the first requirement in constructing an artificial crown. The difficulty in fitting a band to the root of a tooth, consists in the fact that it makes no difference what tooth root you are preparing for a band, you are dealing with the base of a cone, and the further you go down from the base with the band the more off you are. You may think you are making it more secure by going down further, but you are making it more insecure. The reason I mention this is because I have seen so many crowns, put on by some very good practitioners, which had to be removed, and when removed illustrated the defect I have mentioned.

The portion of the tooth you have to deal with is the thickest end, and you have to drive your band over it, and the further you go down, as I have said, no matter how beautifully the work is finished, the poorer and weaker it will be. Illustrating by chart:

Fig. 1

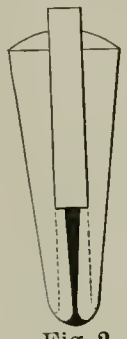


Fig. 2

I will give you another hint: All roots of teeth have canals, or a canal. The canal follows the external form of the root. There has been a great deal of importance attached to posts as a means of stability for the attachment of crowns, but without a post tapers in conformity with the canal of the tooth root, it is an element of weakness. If you put a post that is not tapering into a root canal, the canal must be enlarged to suit the post, whether the post is threaded or plain, the result will be the same, weakening the point of attachment, and the further such posts enter the root canals the weaker the attachment becomes (Fig. 2.) If a smooth, tapering post is used, either square or round in form, previously fastened to the crown to be used, either soldered or baked in the crown, the fixed point of the post becomes an element of weakness; for the crown and post becomes a lever to drag the tapering end of the post from the canal. Now, a tooth crown with a post permanently attached could not be used in connection with a gold or platinum band to embrace accurately the periphery of the root, for of necessity it would have to go on straight, and doing so the band in its relation to the root would be in the condition of Fig. 1. Whenever a post can be used to advantage (which is seldom the case) two fixed points would be preferable, but unfortunately impracticable; one, however, can be obtained, and that one is the end of the post that enters the root. The post, when one *is* used, should be a conical screw, the screw end a little larger than the natural root canal, the blunt end split and slightly spread apart so as to take

hold of the phosphate in the artificial crown. Now, all the roots of teeth in the human mouth cannot be utilized for post anchorage, and such as may be used under ordinary circumstances with safety may be enumerated as follows:

The superior incisors, canines, palate roots of the first and second molars, and if great care is exercised and delicate posts used, the palate canals of each of the bicuspids. Thus we have fourteen root canals out of twenty-six root canals of the teeth enumerated that may be utilized for post anchorage if a canal post is used. Now, it will be observed that there are the same number of root canals in the corresponding teeth of the lower jaw; but the bicuspids of the lower jaw have but one canal in each tooth root, the upper ones two; and the incisors of lower have two canals each, whereas the upper incisors have but one each.

Where a root canal is small as in the lower incisors, a conical post without a screw point would be useless as the canals do not admit of enlargement sufficient to receive the amount of cement necessary to secure it in place; whereas, a conical screw point does not require the assistance of cement to keep it in place, and they are constructed and selected with reference to the size of the canal in each root of each tooth, so that the twenty-six root canals of the teeth of each maxillary can be provided when necessary with a conical screw post, without enlarging the natural canal, which cannot be done with any other form of post. The use of a post in a natural root to give stability to an artificial crown is by no means necessary in the greatest number of cases; and while its use is sometimes indispensable to success, nevertheless I consider the band that surrounds the root a more important factor of stability when properly adjusted. Now, when we reflect that there is not a root of a tooth in the human mouth but presents the base of a cone to the operator, and that this case has an undercut around it, it becomes an easy matter to bevel one-half of the base, leaving the other half undercut—then with a ribbon of gold bent in the form of a hoop approximating the size of the root, with its ends bent at right angles from its circumference, slipped down between the gum and the root a little below the beveled portion —then with a pair of parallel pliers sieze the free bent ends of the hoop and pinch them together—remove the hoop or band,

cut slightly, lap and solder. The band thus made, after the joint is leveled smooth, is again put on the root, by first pressing one portion of its edge under the undercut and forcing it over the beveled side with a foot plugging instrument assisted by a few sharp taps of the hammer. If the band is the right size it will tuck in under the bevel, if not forced down too far. *The band must just pass the lower edge of the bevel and no more.* The band being in place, the next step will be to adjust the crown to the occluding tooth; if there is plenty of room, the crown may be telescoped over or inside the band, but usually in simple contact or flush on the band. The occlusion accomplished, the band is lifted from the beveled side of the root first, it is then soldered to the crown and finished. In setting the crown on to the root permanently, the following incidents should be remembered. When the band was forced onto the root it was adapted to the root contour by stretching, when removed to be soldered to the crown it was again slightly stretched, this can be shown by the easy manner it can be put on and taken off a second time, so in order to have the band fit the root as tight and as perfectly as it did in the first instance, it must be reduced slightly in size by shrinking, and this is accomplished by the use of a shrinking die made expressly for the purpose. The crown now being ready for adjustment it is filled with cement in sufficient quantity and carried to the root, the band portion of the crown pressed close under the undercut and then pressed to and over the beveled side of the root, stretching it as before; when the excess of cement will be forced out, and at the same time carry with it all air bubbles, that otherwise would remain if the crown was put on squarely.

Dr. Swasey. How do you get the band on in that manner when the post is in the root?

Dr. Patrick. If it is a gold crown, which is the only crown that will admit the use of a high post, (being hollow,) if the post extends above the root one-third the depth of the crown it will be quite sufficient; for there would be nothing gained in anchorage, by extending it further when the crown is filled with cement; in such cases the crown would be brought squarely down on the post, then tilted over to the undercut side of the root, and again pressed over to the beveled side of the root and pressed home. As a rule

the most pronounced undercuts of the back teeth are found in their anterior and posterior surfaces; and on the canines and incisors, that bulbous portion at the site of the termination of the enamel on the posterior or palate surface is the point to take advantage of. In putting crowns on the superior front teeth, the band should be first put a little bit under the bulb and then pressed to the front or labial side. The pressure being from behind forwards in these teeth, is in their favor for retention. The posterior and anterior contour of the cervical portion of the inferior incisors are about equal, the lingual side of the canines similar to the upper, but the pressure on these teeth being inwards, they are sustained in their positions by the lateral pressure which they receive. A little practice on the natural roots of teeth out of the mouth, with bands at the points I have indicated, will convince anyone of the correctness of these statements.

Dr. Crouse. Suppose a girl is eating molasses candy. She would pull from the other side.

Dr. Patrick. She could never pull off a tooth with molasses candy that I had put on, even if I had put it on without cement. I have stated that it was seldom necessary to use a post of any kind when a band encircles the root, and it is with this view that I have constructed a porcelain tooth crown with a platinum base or band encircling the cervical margin, baked into the body of the tooth. The tooth is without pins, in the ordinary sense, which admits of the surfaces and margins being made in the true form of a natural one.

The advantages these teeth possess over others may be stated briefly: 1. They can be attached to the band that encircles the tooth root in one soldering. 2. Moisture is effectually excluded from the cement. 3. They can be ground down without fear of exposing pins. 4. They are stronger, from the fact that the point of attachment encircles the whole tooth at its cervical border or margin. 5. They can be soldered together at their lateral margins, a quality which renders them useful for bridge work. 6. All the crowns of teeth in the human mouth where bands can be used, can be reconstructed by their employment, including the inferior incisors, which is almost impossible with any other form of porcelain tooth. 7. They can be soldered to the band at any in-

clination, as the base of the tooth resting inside the band can be rotated as a ball in a socket.

(A few of the teeth made by The White Co. were exhibited.)

Dr. Ames. Can you draw a section of such a tooth as you have described, showing the relative position of the platinum, etc.?

Dr. Patrick. Yes, sir, (illustrating). The back teeth are made in the same manner; you can put a molar tooth onto the band, tilt it in any direction, mark it, slip off the band, imbed the crown, adjust the band and solder from the inside of the band. There are many teeth that can be treated successfully with gold crowns or caps in which the band, which is indispensable in the process of reconstructing a crown on the root of a tooth, is dispensed with. I refer to the molar teeth of young persons, in which the enamel of the grinding surface is defective, granular, full of pits and pin point spots of decay; usually such teeth are superficially decayed at the anterior and posterior surfaces, but not far enough advanced to expose the pulp in removing the defective parts.

If the posterior and anterior surfaces of such teeth are trimmed at right angles with the grinding surface, and the prominent portions of the surface removed, a gold cap or crown can be made to cover the defective portions of the tooth, and if properly made and adjusted, will be superior to any gold filling however well performed. In the accomplishment of such work less preparation of the tooth is necessary, more of the tooth substance is saved, and consequently the patient is relieved from a long and tedious nervous strain in the operation, for the crown or cap is made in the laboratory in a few minutes and, when understood, it takes but a few minutes more to adjust it in the patient's mouth. (Here a natural molar tooth was shown, the crown, covered as described, with a gold cap.) I am very well aware that gold crowns can be made and attached to the roots of teeth after a fashion, and to answer a purpose, I am also aware that porcelain crowns are manufactured and used, with a total disregard of the anatomy of the living parts for which they were designed to be attached.

Very clever and ingenious men, with commendable industry, do produce gold crowns made up of solder, shreds and patches,

and whose value of their own productions is based more on the amount of labor expended on the work, with the fewest number of tools, rather than symmetry of construction, with the smallest expenditure of labor and the least amount of solder. A gold crown should be made from one piece of metal, and when formed should be of an uniform thickness throughout. This cannot be accomplished by driving the metal from which the crown is made into a hard die with lead. In either case the metal plate becomes of an unequal thickness; the margin of the grinding surface becomes thin, and the sides are thrown into unequal folds; these folds when beat down cause the sides to become thick in places. If the folds are cut out and the opposing parts brought together and soldered, the pliability of the metal is destroyed. I have stated that a crown, to be of value should go on the root with a stretch, in order to adapt it to unequal surfaces. It will be recognized at once that uniformity of the thickness of the metal and the smallest amount of solder compatible with strength is an important factor in the accomplishment of this end.

Dawson's White Alloy!

GOOD COLOR,

GOOD EDGE STRENGTH

AND DOES NOT CHANCE IN THE MOUTH,

There is Nothing "Just as Good."

Some claim to have just as good, but the demand and sale of DAWSON'S WHITE ALLOY steadily increases, and so it will continue when many of the so-called preparations are forgotten.

FOR SALE BY ALL THE PRINCIPAL DEALERS IN DENTAL GOODS.

American Dental Manufacturing Co.

1298 & 1300 Broadway, NEW YORK.

MANUFACTURERS OF

FINE INSTRUMENTS, FILLING MATERIALS,

Mouth Mirrors, Syringes, and Sundry Other Goods.

Write for Catalogue.

THE

Illinois State Dental Society

WILL HOLD ITS

Quarter Centennial Meeting

AT **QUINCY,**

The Second Tuesday in May, 1889.

It is hoped the Dentists of the State will come in such numbers that the membership may be largely increased.

Those from other States are also cordially invited.

Caulk's Filling Materials.

ESTABLISHED 1877,

FOUR COLORS and LIQUID.—Gray, Yellow, Medium and Light $2.00 per Pkg.
TWO COLORS and LIQUID.—Gray and Yellow, ... 1.50 " "
ONE COLOR and LIQUID.—Gray, Yellow, Medium, Light or Gum, 1.00 " "

This Compound Stands Without a Rival.

Used for TEN years by Leading Dentists throughout the world.

DIAMOND CEMENT Should not be classed with the so-called oxy-phosphates, as is often the case--the materials of which it is composed and its process of manufacture being entirely different--hence its Superiority.

It HARDENS in WATER or SALIVA. Two or more colors blended together (mixing) will produce any shade desired.

CAULK'S PAR-EXCELLENCE ALLOY.

This Gold and Platina Alloy is manufactured on a new principle. Saves teeth where others fail. It is the result of a long series of experiments, and has been in constant use for TEN years. By our NEW METHOD of manufacture there is no GUESS WORK. The molecular change is controlled, making each and every ingot always and absolutely alike in its properties.

Price, in ⅓, ½ and 1 ounce packages, per ounce, $3.00; two ounces, $5.00.

Caulk's White Alloy

has been greatly improved. There is nothing equal or superior to it. It is of a peculiar grayish-white color. When properly manipulated with our Purified Mercury it will retain its color under all circumstances.

Price, in ¼, ½ and 1 ounce packages, per ounce, $4.00; two ounces, $7.00.

Caulk's Diamond Point Stopping and Gutta-Percha Points for Filling Roots.

Price, in ⅛, ¼ ½ and 1 ounce packages, per ounce (reduced) to $2.00.

All of Caulk's Filling Materials are sold by Troy Wright and sent by mail.

Over 15,000 Dentists are using these materials throughout the World. What better evidence do you wish of their Superiority and Excellence?

L. D. CAULK, Manufacturer,

CAMDEN, - - - - - DELAWARE.

H. D. JUSTI,

1301 ARCH STREET,

Philadelphia, Penn.

MANUFACTURER OF

PORCELAIN TEETH,

AND

DENTAL MATERIAL.

Instruments and Supplies

OF THE BEST QUALITY FOR

STUDENTS AND PRACTITIONERS.

H. D. JUSTI,

66 MADISON STREET.

Chicago, Illinois.

UNIVERSITY OF ILLINOIS-URBANA
617.606IL C001
TRANSACTIONS AT THE ANNUAL MEETING
24 1888
3 0112 025313369